

# THE IRON AGE

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## New Production Foundry in South

Equipment for Molding and Pouring and Plant Lay-out Insure Large Output of Street Lighting Standards—Sandslingers Used

BY ROGERS A. FISKE\*

CONCENTRATION of manufacturing at one point has been undertaken by the King Co., 230 South Clark Street, Chicago, maker of street lighting standards, brackets and newels. A new plant has been built and put into operation at Sheffield, Ala., and the company's two former foundries, one at St. Joseph, Mo., and the other at Chicago, have been dismantled. The new foundry is equipped for a melt of 75 tons of iron per 8-hr. shift, and it is estimated that 240 lighting standards can be cast per turn. The former No. 1 plant, which was located at St. Joseph, Mo., was operated on three 8-hr. shifts up to the time that it was closed. The No. 2 plant, at Chicago, was operating on single turn when it was shut down. On a single 8-hr. turn basis the new Sheffield foundry has double the combined capacity of the two old plants operating on three 8-hr. shifts.

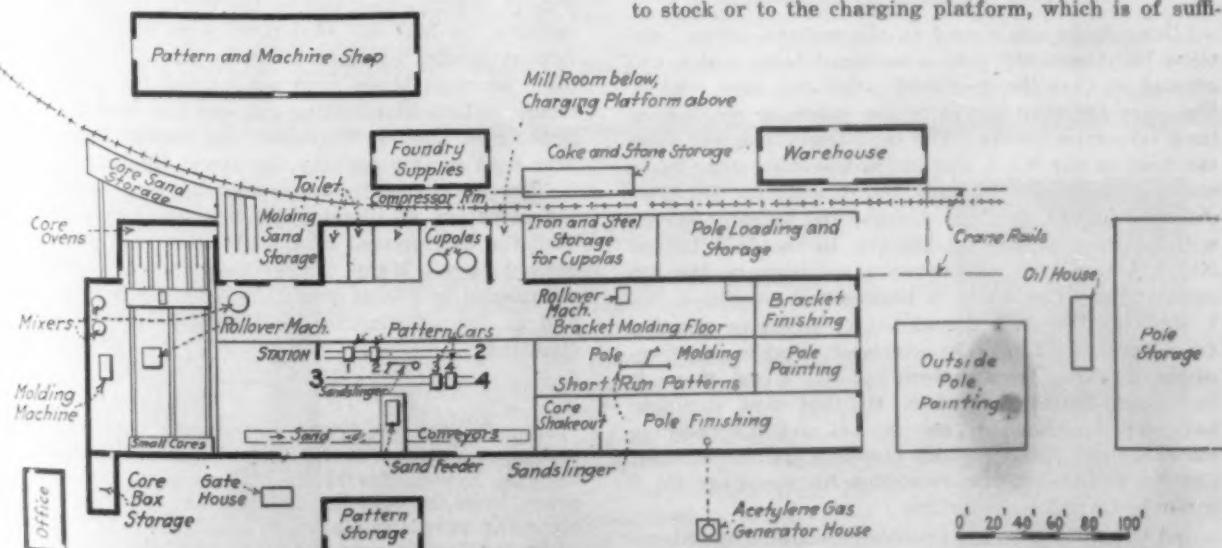
The location at Sheffield is favorable. It is not far removed from the dam constructed by the Government

at Muscle Shoals, from which power is distributed by the Alabama Power Co. The plant has a switch track connection with the Southern Railway and lies a short distance from blast furnaces of the Sloss-Sheffield Steel & Iron Co.

The main building is 175 x 460 ft., and other units include a pattern and machine shop, 48 x 170 ft., a warehouse, 34 x 100 ft., a foundry supply house, 34 x 70 ft., an oil house, 20 x 34 ft., a pattern storage building, 35 x 60 ft., a timekeeper's office, 15 x 20 ft., and a two-story general office building, 28 x 50 ft. The St. Louis Structural Steel Co., St. Louis, fabricated the steel framework.

Extending parallel to the main building is a 220-ft. crane runway with a span of 51 ft. Mounted on the runway, one side of which is supported by the building structure, is a 5-ton electric traveling crane, supplied by the Northern Engineering Works, Detroit. Raw materials are switched to a spur beneath the crane, which is used also to load finished products for shipment. Cupolas are located at one end of the runway so that pig iron and coke may be handled from cars either to stock or to the charging platform, which is of suffi-

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THE Sandslinger Shown Between Two Tracks on the Left Side of the Plan View Serves the Production End of the Foundry. As fast as drags and cores are placed on the pattern cars, designated Nos. 1 to 4, they are rammed by the sandslinger. As soon as a core or drag has been rammed, it is removed to a mold finishing rollover machine and the pattern car is returned to the station of the same number at the end of the track to receive another flask and pattern.

cient size to provide for the storage of materials for one day's operation of the plant.

#### Cupolas Melt Pig Iron Mixed with Steel

There are two No. 4 Whiting continuous-pour cupolas, and each is lined down to a capacity of 5 tons per hr. The pig iron used has a high silicon content and is mixed with steel, the resulting product having been given the trade name of "Ferronite." This metal has the strength necessary for the service to which street lighting standards are subjected. Moreover, it is rust-resisting, and it has the quality of holding the more or less intricate ornamental design of the molds.

One motor-driven, positive type blower, supplied by the Wilbraham-Green Blower Co., Pottstown, Pa., serves both cupolas, a shut-off gate having been located in the branch pipe to each unit. The power used at the Sheffield plant is purchased from the Alabama Power Co. The motor and control equipment throughout was furnished by the General Electric Co., Schenectady, N. Y. The large motors are designed for 2300-volt, 3-phase, 60-cycle current and the small motors for 220-volt, 3-phase, 60-cycle current. The lighting circuit operates at 110 volts.

A battery of six oil-fired ovens, furnished by the Mahr Mfg. Co., Minneapolis, Minn., is used for baking dry-sand cores. Each oven is 9 x 20 x 7 ft. and is fired by Mahr No. 99 burners. Fuel oil is stored in a 15,000-gal. underground tank, and before passing to the burners it is pumped through electric heaters made by the General Electric Co.

#### Molding Is on Production Basis

Lighting standard molds are made by means of two Beardsley & Piper sandslingers. One sandslinger is placed so that it can swing to either side over parallel narrow-gage tracks on which are operated the cars that carry the cores and drags, which are made in three sizes, 12 ft., 16 ft. and 20 ft. This sandslinger is served by two 7-ton electric cranes and two monorail hoists, all of which were built by the Chisholm & Moore Mfg. Co., Cleveland. The sandslinger is located midway between the ends of the tracks, and its station is known as the ramming position. Four pattern cars are mounted on the tracks, the ends of which are given station numbers. Stations No. 1 and No. 2 are at opposite ends of the track on one side of the sandslinger, and stations No. 3 and No. 4 are at the extreme ends of the opposite track.

#### Continuous Ramming by Sandslinger

Drag flasks are placed on the pattern cars at stations No. 1 and No. 4 by a monorail hoist, which was erected so that the overhead crane can pass over it. The cars are then moved to the ramming position on their respective tracks. The sandslinger operator rams the drag on car No. 1, and in the meantime drag flasks are placed on pattern cars No. 2 and No. 3. After the drag on No. 1 car is rammed the operator moves, without stopping the sandslinger, to the flask on car No. 4, which is in the ramming position on the opposite track. Car No. 1 is then moved to station No. 1, and car No. 2 is moved to the ramming position from station No. 2. The overhead electric crane removes the drag from pattern car No. 1 and places it on a mold-finishing roller. By that time ramming has been completed on car No. 4, and the operator moves to car No. 2 without stopping the sandslinger. Car No. 4 is then moved to station No. 4 and car No. 3 is moved to ramming position.

At the same time the overhead electric crane places the cope flask on car No. 1, and the operations are repeated with cope flasks in the same manner as with drag flasks. The overhead crane then removes drag No. 1 from the roller and places it on a flask car, and the cores are set by means of push cranes. This

is repeated with drags No. 4, No. 2 and No. 3. After the cores have been placed and the molds have been clamped, the flask cars are moved to a side bay and poured. In the pouring bay are two 3-ton, single I-beam, overhead push cranes furnished by the Armington Engineering Co., Euclid, Ohio. Upon each crane are mounted a 2-ton Chisholm & Moore electric hoist and an Armington trolley with chain hoist, from which is suspended a 1000-lb. ladle. After cooling, the cope is moved to the shakeout, and the flask is placed in position under the monorail that serves the sandslinger. The casting is then removed and placed on a car which conveys it to the core shakeout.

The second sandslinger is used for short-run orders and is located in the center bay.

#### Molds Are Poured from Both Ends

Standards cast in the shop range in weight from 200 to 1500 lb. each. A 3000-lb. top-pour ladle is used to transport the hot metal from the cupolas to the pouring bay. The 1000-lb. ladle is filled from the 3000-lb. ladle, and then the mold is poured simultaneously from both ends, using both the large and small ladles.

Compressed air for air hoists and bumping machines is furnished at 90 lb. pressure by a two-stage compressor, built by the Gardner Governor Co., Quincy, Ill.

The shakeout is accomplished by an air hoist, made by the Curtis Pneumatic Machinery Co., St. Louis. The sand falls into a pit, from which it is removed by a conveyor, furnished by the Stephens-Adamson Mfg. Co., Aurora, Ill. This sand is delivered back to the storage bin at the sandslinger. Cores are knocked out, and the sand is returned by a conveyor to storage in the core room. The fins and gates are chipped off, and the castings are then cleaned by a power wire brush. A portable grinder, supplied by the United States Electrical Tool Co., Cincinnati, is used to smooth off rough parts.

The standards are then weighed and are finally given two coats of paint. A Fordson tractor, which is equipped with a boom, transfers the finished product from the shop to the loading crane on the yard runway. Two standards can be handled on one trip.

The design and construction of this plant were under the supervision of Julius J. Gruenfeld, engineer, and George G. King, manager at Sheffield.

#### Street Lighting Began in Paris

Street lighting is comparatively modern. Paris, France, was the first city in the world to install street lighting. In 1558 its inhabitants were ordered to place lighted candles in front of their houses, and in 1788 pitch or resin bowls were substituted for candle lanterns. In 1809 illuminating gas was first used for street lighting in London, England. Gas mantle lamps were first used in this country for street lighting in 1896.

The history of modern street lighting began with the invention of illuminating gas and has continued with the development of the arc lamp and the incandescent light. Many improvements have marked developments in recent years, both in the lighting unit and in the construction and design of the lighting standard.

The Swedish machinery industry in 1926 was prosperous, according to Assistant Trade Commissioner Emil A. Kekich, Stockholm. The export value of the group "vessels, vehicles and machinery" during 1926, according to official statistics, amounted to \$34,627,440, while the same figure for 1925 was only \$28,729,500. Russia, which formerly purchased large quantities of Swedish tools, bought little during the year. The Swedish ball bearing industry worked at full capacity during the past year, and sales have increased considerably in spite of strong foreign competition.

# Metallurgists Discuss Pig Iron

Foundry and Steel Making Troubles Aired at Mining Engineers' Convention—Research Study Planned—Several Medals Presented

**T**WO sessions were conducted by the iron and steel committee of the American Institute of Mining and Metallurgical Engineers at its annual February meeting in New York last week, Feb. 14 to 17. One was devoted to miscellaneous steel subjects, some of the chief features of which were reported in *THE IRON AGE* last week. The other, a discussion on carbon in pig iron, is reported in the following pages.

One of the best technical programs which the Institute of Metals Division of the A. I. M. and M. E.

ever presented was attended by enthusiastic groups. The report of the chief features of these sessions will be covered in a later issue.

The presentation of the annual lectures drew large crowds. The fourth Henry M. Howe memorial lecture was delivered by Bradley Stoughton, head of the department of metallurgy, Lehigh University, South Bethlehem, Pa. The fifth Institute of Metals lecturer was Dr. Cecil H. Desch, Sheffield University, Sheffield, England.

## How Much Carbon in Pig Iron?

**T**HAT a clearing of the atmosphere is necessary as to just what the properties of the pig iron should be as it is furnished by producers to various users was demonstrated by the round table discussion on carbon in pig iron. It was decided by the iron and steel committee of the institute last fall that such a discussion would be of much profit to all concerned, and, as a result, a program was arranged for the meeting last week. Complaints are frequently heard in gray iron, malleable and steel fields that something is wrong with the pig iron. One question which has been uppermost is how much carbon should there be in the different grades.

Under the designation of "Carbon in Pig Iron," a program was arranged comprising four papers. The chairman of the session was Ralph H. Sweetser, vice-president, American Rolling Mills Co., at Columbus, Ohio. In opening the meeting he called attention particularly to the fact that the blast furnace has no specifications for total carbon, expressing at the same time a doubt whether users of pig iron really know just what this total carbon should be. The object of the committee, he said, was to obtain views with the object of initiating a program of research, if necessary.

The situation confronting both pig iron users and producers was presented in a paper entitled "Need for Research in Foundry Pig Iron," by Dr. Richard Moldenke, Watchung, N. J. The major portion of this paper is published on other pages.

Doctor Moldenke, in presenting an outline of his

paper, said that foundrymen are aware of the desperate position in which the blast furnace man at present finds himself. Not only has he European iron to contend with, but he has other drawbacks, such as increasing cost of labor and materials. As a result, he frequently has to reduce his costs by the use of scrap or cut down his coke burden. Scrap being cheap, large quantities are frequently used. As a result, oxidized iron is being produced. He cited the recent instance of an iron containing 2.70 per cent silicon which produced castings having numerous hard spots. The only recourse of the foundrymen in this case is to mix high-grade iron with the so-called "off-iron." The present need is a higher quality iron in the castings and more accurate castings to save machining. The speaker said the really important thing is the total carbon. "Can we specify a minimum total carbon and find some way to detect good iron from poor as regards its strength, etc.?" he asked.

Representing the malleable iron interests, a paper entitled "A Pig Iron, Low in Total Carbon, Is in Demand for Use in Various Industries," by Dr. Enrique Touceda, Albany, N. Y., was presented by title in his absence. In part, Doctor Touceda said that the question as to the proper amount of total carbon that the malleable foundry would prefer for use in the production of air furnace white iron castings must be considered from different angles, that is, whether it is desirable or advantageous from an economic standpoint to use some low carbon scrap in the mixture or make

### Lectures by Two Prominent Metallurgists

**D**R. CECIL H. DESCH delivered the annual Institute of Metals lecture. He is a prominent British scientist and a fellow of the Royal Society since 1923. He has presented many papers before foreign technical societies and is the author of several books on metallurgy.

Bradley Stoughton was the annual Henry M. Howe memorial lecturer. He is well-known as the author of a treatise on iron and steel metallurgy. For several years he was secretary of the institute.



DR. CECIL H. DESCH



BRADLEY STOUGHTON

use of pig and sprue only. It is at once apparent that, even if carbon in pig iron is considered as a scrap carrier, no possible advantage arises from the use of high carbon pig iron; first, because the use of the mixture of steel or malleable scrap introduces a serious uncertainty regarding the objectionable properties these products may carry and, second, because at times there is very little, if any, difference in cost between scrap and pig iron. Consequently the only logical conclusion is that it would be greatly to the advantage of the manufacturer of air furnace castings, which are subsequently to be annealed, if he could purchase the bulk of his pig iron having a carbon content not in excess of 3 per cent.

Stated in another way, if a 3 per cent carbon pig iron could be purchased to form the base of the mixture, control of the mixture, as far as carbon is concerned, would be facilitated while the use of such iron would serve to eliminate many of the difficulties that exist today. The author said that he recognized the fact that the making of a pig iron running 3 per cent or lower in carbon cannot regularly be effected in the blast furnace proper but he does believe it would be possible and practical to accomplish this by means of an auxiliary installation in the cast house. Finally, if proper thought be given to the matter, it will be realized, he says, that in practically all ferrous metallurgical processes a low carbon pig iron would be more suitable than one that is high in this element.

#### Carbon in Basic Iron

Under the title, "Carbon in Pig Iron," Ralph H. Sweetser presented a paper which was the result of experiments conducted in 1923 to ascertain if possible the temperature of pig iron as it comes out of the blast furnace and the effect which this might have upon the total carbon and the character of the iron as related to the silicon content. Carbon in pig iron has been accepted but seldom specified, says the author. How it gets into the pig iron as it is being smelted in the blast furnace, and just why about so much of it enters into the pig iron in certain blast furnaces and more or less of it in other furnaces or in the same blast furnace under varying conditions, are problems which have not yet been satisfactorily solved. That the temperature or the kind of coke are factors is contended by the author. "For the past four years at our annual meeting," said Mr. Sweetser, "I have asked the open-hearth men: 'How much carbon do you want in your pig iron and why?' A question which is still unanswered except for the counterquestion, 'If we say how much carbon we want, can the blast furnace man control the percentage?'"

The paper gives the results of the experiments referred to and shows analyses of many different casts in some of which the total carbon runs as high as 4.50 to 4.96 per cent. The higher percentages were evidently obtained when a grade of coke known as Pocahontas was used. The paper gives the details of the experiments, how the temperatures were taken and what the analyses represent. The author concludes that it is evident, within the limits of the particular tests referred to, that while making basic iron with by-product coke the carbon and silicon tend to increase with increased temperature and that the sulphur decreases.

#### Copper-Bearing Pig Iron

A paper of considerable length discussing "Carbon Characteristics of Copper-Bearing Pig Iron," was presented by W. B. Coleman of W. B. Coleman & Co., consulting metallurgists, Philadelphia. The paper is accompanied by a large number of photomicrographs and tables, together with data furnished by the Robesonia Iron Co., Reading, Pa. The author concludes that pig irons have been produced of approximately the same chemical analysis but exhibit entirely different physical properties when remelted and poured into castings. Also that a pig iron, on being remelted and tending to produce ferrite in the castings promotes greater machinability and softness, emphasizing the importance of the presence of ferrite in the structure of the iron. He also states that the additions of less

than 1 per cent of metallic copper to molten iron did not seem to alter the physical properties of the castings.

#### Discussion Varied and Profitable

AN interesting discussion accompanied the presentation of these papers with representatives of the foundry and steel-making interest taking active part. Among those who were heard from were Dr. C. H. Herty, Jr., Bureau of Mines, Pittsburgh; T. L. Joseph, central experiment station, Bureau of Mines, Minneapolis, Minn.; E. J. Lowery, Hickman, Williams Co., Chicago; J. T. MacKenzie, chief chemist American Cast Iron Pipe Co., Birmingham; Robert Job, vice-president Milton Hersey Co., Ltd., Montreal, Canada; Prof. H. M. Boylston, Case School of Applied Science, Cleveland; E. P. Ross, Colonial Iron Co., Riddlesburg, Pa.; A. L. Feild, Central Alloy Steel Co., Canton, Ohio; Prof. D. J. Demorest, professor of metallurgy, Ohio State University, Columbus, and A. Marks, a British metallurgist, and Morten Grindal of Bergen, Norway.

One speaker stressed the need of the proposed research and commented upon the value of Doctor Moldenke's paper as emphasizing this necessity. For the foundry to progress it was pointed out that such a study was needed and that systematic, cooperative research would be valuable.

There was some controversy as to the comparative amounts of charcoal and coke necessary to make a ton of pig iron. The net result of various opinions expressed was that less charcoal was needed. One result of the research would probably be that it would be found that certain kinds of fuel put more carbon into pig iron than others.

#### The Use of Scrap

On the question as to the use of scrap in making pig iron, one speaker insisted that no one knows just what scrap does to pig iron in the blast furnace. Doctor Moldenke pointed out that at one time so much scrap was being used in Germany and the iron produced was so bad that the use of scrap had to be abandoned. Another speaker testified that a moderate amount of scrap was not harmful, but if the amount of coke used in the blast furnace is cut down, considerable oxidation is possible. Even in such a case, however, less trouble is experienced in the use of this iron in the open-hearth than in foundries. That cupola operation is often to blame was the opinion of another participant in the discussion who pointed out that one plant which was using three brands of iron with unsatisfactory results tried three other brands, and the troubles continued.

On the question of low carbon pig irons, brought out by Doctor Toucada's paper, an opinion was expressed that such iron was not desired, and that the blast furnace could not make such a product any more cheaply, if at all. He insisted that nothing could be gained from the use of a low carbon pig iron. If a pig iron was high in total carbon, the quantity could be lowered by the use of more scrap.

#### Amount of Carbon Has Little Effect

Doctor Herty, in presenting a report of the subcommittee on carbon in pig iron of the open-hearth committee of the institute, gave a brief recital of some of the work that had been done. He emphasized in particular the fact that low silicon pig irons contain more oxides than high silicon pig irons. He felt that the investigation that he was conducting would result in finding out that one cause of the trouble the steel man is having is the presence of oxides, particularly as silicates, and that the amount or form of carbon in pig iron has nothing to do with open-hearth troubles. He suggested that, if foundrymen and blast furnace men get together in an investigation, only fundamentals should be considered.

The question of the use of open-hearth slag as a charge in the blast furnace was brought up by one speaker. The testimony of some operators was that 3 to 4 per cent had been used, but that they did not

care to use it regularly. The main object, however, was to recover the manganese content.

Not a little interest was created by the suggestion that smaller pigs be cast for melting purposes. The general testimony in the discussion of this point was that where this had been tried it was a distinct advantage.

Morten Grindal, of Norway, who has been in this country since the foundrymen's convention in September, studying various metallurgical problems, paid a tribute to the work of Doctor Moldenke in foundry research, and also stated that nowhere in the world had so much attention been paid to the study of cupola and other foundry troubles than in the United States.

A. Marks, of England, spoke of some British experiences during the war, and made the rather inter-

esting statement that it had been possible during the war, when high-grade materials were difficult to get, to produce castings equal to those made from charcoal iron by a careful attention to details of foundry operations. One important factor in good foundry practice was attention to the temperature of the mold, the study of which he believed was vital in the production of good castings.

The round table discussion, which started in the morning, was resumed after the luncheon hour, so great was the interest. The conclusion of the conference was that the opinions expressed would be carefully studied and that a recommendation be made to the iron and steel committee as to just what kind of a research should be inaugurated and how it should be carried out.

## Presentation of Awards and Other Events

THE feature of the banquet, Wednesday evening, Feb. 16, at the Waldorf-Astoria, which was a colorful and largely attended affair, was the presentation of awards and medals. Following brief addresses by the retiring president, Samuel A. Taylor, and the new president, Everette L. DeGolyer, the toastmaster, Thomas B. Stearns, mining and mechanical engineer, Denver, Colo., initiated the presentation of the medals. A feature this year was the appointment of sponsors for each recipient, who in brief speeches introduced the persons upon whom the honors were conferred.

The first award of a medal established this year by Dr. William L. Saunders, past president of the institute, known as the mining medal, was presented to Dr. David W. Brunton, who was introduced by Charles F. Rand, chairman of the Saunders gold medal committee. Doctor Brunton, who has served two terms as president of the institute and one as president of the American Mining Congress, is a consulting engineer in Denver, Colo. He is prominent in many technical societies here and abroad, and was cited for valuable work in the report to Congress in the year 1918 by the Secretary of the Navy.

The fifth recipient of the James Douglas Medal, awarded for distinguished achievement in non-ferrous metallurgy, was Dr. Zay Jeffries, consulting metallurgist for the Aluminum Co. of America and several other large companies, and at present treasurer of the American Society for Steel Treating, with which organization he has been intimately connected since its early history.

Doctor Jeffries was introduced by Dr. Paul D. Merica, research director, International Nickel Co., New York, and chairman of the Institute of Metals Division of the mining engineers. Among Doctor Jeffries' many contributions to science, those relating to tungsten, X-ray analysis, and the development of aluminum and high-strength light alloys stand out prominently. A notable achievement was his presentation, in collaboration with R. S. Archer, of a general theory of the hardening of metals and alloys and the writing of a book entitled "The Science of Metals." The board of directors of the American Society for Steel Treating was present by invitation of the institute.

This year the bestowal of the J. E. Johnson, Jr., award was made to Thomas L. Joseph, superintendent, north central experiment station, United States Bureau of Mines, Minneapolis. The award was established in 1921 to encourage young men, working along lines of research followed by the distinguished metallurgist whose name it bears. Dr. John A. Mathews, vice-president Crucible Steel Co. of America, and chairman of the iron and steel committee of the institute, introduced Mr. Joseph, stating that the award was bestowed this year for the development of an experimental blast furnace and for research on factors controlling contact between gases and solids in the shaft.

### Two Steel Meetings Scheduled

Two important meetings are scheduled in the near future under the auspices of the institute. A session on manganese is being arranged by the iron and steel committee for the third week in April in Cleveland.

At this meeting various phases of the manganese problem will be discussed, particularly the use of manganeseiferous iron ores, the recovery of manganese from slags, the conservation of manganese and the benefits of the use of more manganese in open-hearth practice. It is hoped that Sir Robert Hadfield of England can be present.

On May 3, 4 and 5 a meeting of the open-hearth committee has been scheduled at the Hotel Statler in Buffalo, and the intention is to have a discussion of a



DR. ZAY JEFFRIES was presented with the James Douglas medal. His contributions to the literature and discussions of ferrous and non-ferrous technology rank him as one of the leading American metallurgists.

series of questions instead of the presentation of a number of technical papers.

### Institute of Metals to Meet with Steel Treaters

A decision was reached by the executive committee of the Institute of Metals division that it will hold technical sessions with the American Society for Steel Treating at its annual convention in Detroit, Sept. 19 to 23. A joint session with the steel metallurgists as well as separate sessions are planned. The moving forward of the annual convention of the American Foundrymen's Association to June, in conjunction with which such meetings have generally been held, is a reason for the change.

The Italian iron and steel industry is reported to have been facing a crisis during the past few months, with the output of ferrous metal products declining sharply, especially during November and December, and the whole situation aggravated by the general credit stringency, says Assistant Commercial Attaché A. A. Osborne, Rome.

Fire damaged billet house No. 2, South Works, American Steel & Wire Co., Worcester, Mass., to an extent estimated at \$10,000. Billet production, however, was delayed only a few hours.

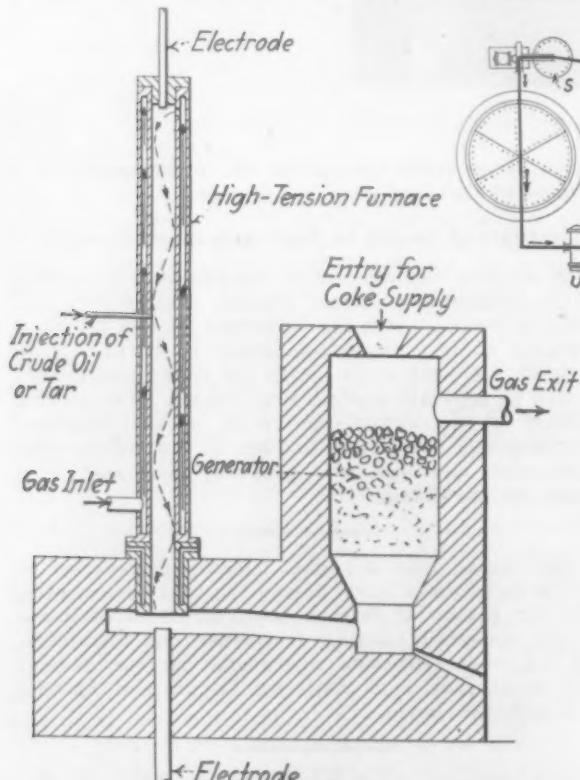
# Eliminating Blast Furnace in Norway\*

Carbon Monoxide and Hydrogen Gases Utilized—Metal Produced Practically Free of Carbon—May Use Poor Ores Without Beneficiation

METALLURGISTS in various parts of the world have long striven in vain to repeat under modern conditions, on an economic basis, the ancient art of producing iron and steel direct from natural sources, avoiding the carburizing process in the blast furnace, with the necessary later oxidation of the excess carbon. Prominent names in several leading countries have been associated with the task: William Beardmore and Hornsey in England, Bassét and Vermaes in France and Belgium, Sieurin and Gronwald in Sweden, Bourcoud in Canada. In this country the Bureau of Mines, in "Reports of Investigations, serial 2656," discusses the various developments.

Although scientifically attractive, the idea of producing iron direct from its ore cannot alone account for all the time, labor and capital invested in the attempts to arrive at a practical solution. The real motive power behind past and present efforts may

*Fig. 2. Diagrammatic Representation of the Units Forming the System. a = ore; b = crusher; c = second crusher; d = preheating furnace; e = reducing kiln; f = cooling chamber and steam producer; g = crushing mill; h = magnetic separating drums; i = briquetting press; j = briquetted iron sponge; k = gangue; l = oil or tar; m = oil tank; n = high-tension electric furnace; o = electrode; p = generator; q = coke addition; r = recuperator; s = gas-washing apparatus; t = gas storage bell; u = gas circulating pump; v = gas meter; w = contact apparatus for reaction  $CO + H_2O \rightarrow H_2 + CO_2$ ; x = steam injection; y = compressor; z = regenerative absorption of carbon dioxide gas*

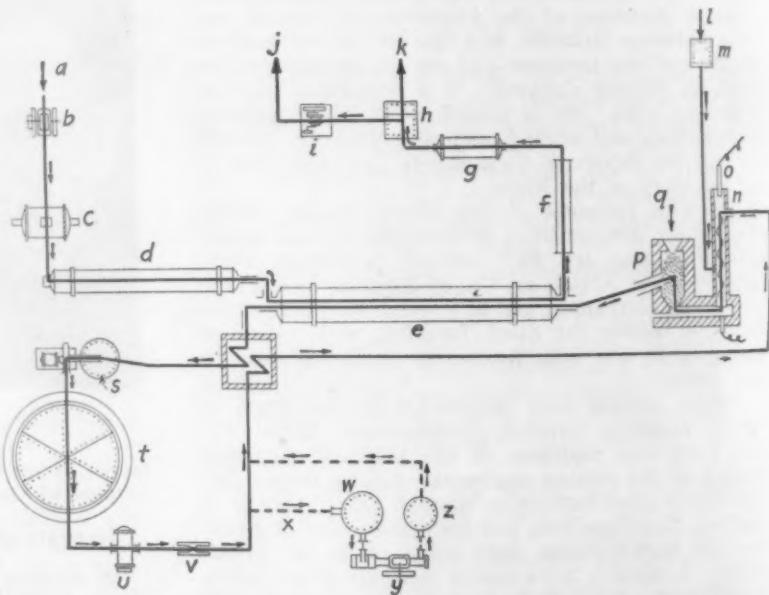


*Fig. 1. High-Tension Electric Furnace and Gas Generator. Arrows indicate flow of gas*

safely be said to be the ever-present human desire to force the metal to yield its utmost in its service to mankind.

It is a sad fact that, while the primitive methods used by the ancient metallurgist—producing as he did iron and steel direct from its natural sources—resulted in products of high quality, the ever increasing quantity production of modern times has been effected partly at the sacrifice of quality. Hence the resorting to duplex and triplex processes. Even at that, the pig iron produced under basic conditions in the blast furnace evidently, from its very birth, inherits weaknesses which cannot be overcome by any known means. Charcoal pig iron, produced under an acid slag, and strongly reduced, is the best known material for quality production; the high cost, however, prohibits its adoption for real quantity utilization.

Knowing the high standard of the products of his ancestor craftsman, the modern metallurgist has naturally pondered over the possibilities of finding means, on an economically profitable basis, for large quantity production, to return to the principle of producing iron from its natural sources, without melting the metal.



The fact that the largest producer of steel in the world is to start a plant for producing steel from the kiln in a plant at Lorain, Ohio, shows that many practical difficulties must have been overcome.

It may be of interest to readers of THE IRON AGE to learn about the present work being done in Europe, where important German concerns—Krupp and Badische Anilin und Soda-fabriken—are cooperating, with others, in A/S Norsk Staal, Trondhjem, Norway. The leader of the experimental plant there, E. Edwin, a Norwegian metallurgist educated in Germany, has conducted his research along original lines. In a paper read before leaders of the Swedish iron industry at Grengsberg, Sweden, on May 14, 1926, Mr. Edwin tells of the work done and the results achieved.

## Reduction with Solid Agents

In their attack on the problem, experimenters have mostly used carbon mixed with the ore, heated to more than 1500 deg. Fahr. This form of direct reduction

\*Translated from *Teknisk Ukeblad*, by Morten Grindal, Plainfield, N. J.

would evidently be associated with less trouble than the efforts to utilize reducing gases only. The Bureau of Mines, Bassett, Hornsey, Beardmore and others all developed systems based on reduction with solid agents. The direct reduction is, however, strongly endothermic. A considerable quantity of heat must be added during the process and, as the best working temperatures are high, about 1850 deg. Fahr., local overheating may occur. Apart from formation of silicates, such overheating is likely to result in the highly objectionable reduction of any phosphorus present, which cannot be

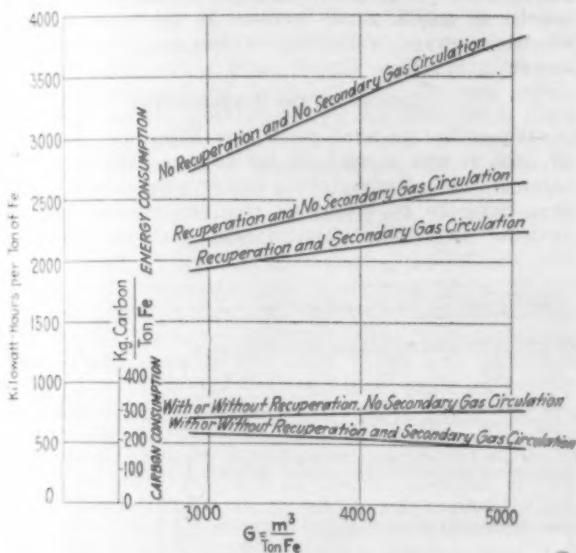


Fig. 3. Consumption of Electrical Energy and Carbon in Relation to Gas Circulation

removed without melting. Pure ores and charcoal may be used, if economic considerations are not prohibitive.

The problem before A/S Norsk Staal was a difficult one: To produce high-grade iron sponge when using low-grade ore without charcoal. Right from the start the firm wanted to work with low-grade raw materials, because of the important economic advantages of so doing. Mr. Edwin states the price of usable ore to be about 40 to 45 marks per ton of iron produced at the blast furnace in Westphalia, Germany, while ore high in silicates may be delivered at a plant situated at the western fjords of Norway for 15 marks per ton of iron produced. Similar conditions seemingly exist in Sweden. If it were possible to utilize the cheap ores, without preliminary expensive treatments, a gain would be made in the competition with the blast furnace metal, of 25 to 30 marks per ton of iron, or about 35 to 40 per cent of the total selling price.

Market conditions excluded the use of charcoal, thus enforcing the use of reducing gases produced from coal or coke. Mr. Edwin was quite aware of the advantages of gas reduction, which he claims to be:

1. The possibility of utilizing poor ores in their natural condition, as the low reducing temperatures and security against local overheating prevent reduction of any impurities in the gangue.
2. The reduction can be accomplished practically without any heat absorption, when using carbon monoxide and hydrogen gases. When properly isolated against heat losses, no heat need be applied to the reduction chamber itself.
3. The impurities generally present in most kinds of coal may be easily removed from the gas produced therefrom. All impurities in the ore, such as phosphorus, will, after the completion of the process, still remain in the rock in its original combined form, and may be mechanically separated from the metal.
4. It is possible to produce a metal practically chemically free of any carbon content.

#### Difficulties to Be Overcome

1. The efficiency of the reducing gas is very low; for carbon monoxide hardly more than 25 per cent can be made effective. As the calorific value of any gas is always more expensive than that of the solid from which it has been produced, it is evident

that special arrangements must be made to overcome the economic difficulties.

2. Further, as the problem presents itself, the demand for pure carbon and hydrogen gases is enormous.

3. Again, these gases had to be heated to 1850 to 2000 deg. Fahr. without changes in their chemical constitution taking place.

To attain a better utilization of the reducing gases, it would evidently be desirable to regenerate the products of reduction, mainly  $\text{CO}_2$ , by treating this gas with carbon, thus producing fresh carbon monoxide. The all-important achievement by A/S Norsk Staal is the fact that suitable technical means for such effective regeneration of the reducing gases really were developed.

This problem was solved by means of the long, stable, high-tension electric arc of the type used in the nitrate industry by the Badische Anilin und Soda-fabriken. The calorific heat absorbed by one cubic meter of  $\text{CO}_2$  gas in its regeneration to  $\text{CO}$ , 1800 kilogram-calories, is supplied to the gas in a fraction of a second in the high-tension electric arc. A high-tension furnace of the type used by A/S Norsk Staal is diagrammatically shown in Fig. 1.

#### High-Tension Electric Arc Furnace

Such a furnace mainly consists of a tube several meters long, in which the high-tension electric arc is maintained in stable equilibrium, while the gas to be treated passes from one end of the tube to the other in strongly whirly motion. Some of the carbon required for the regeneration is added in the tube as crude oil, hydrocarbon gases, tar or even pulverized coal. To secure efficient work, however, the gases must leave the furnace at a temperature of 2900 to 3100 deg. Fahr., which is too high for direct use in the kiln. The sensible heat from 3100 to 2000 deg. Fahr.

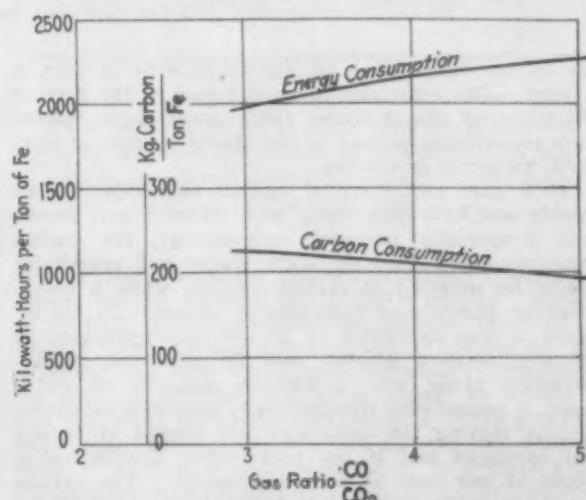


Fig. 4. Relation of Electrical Energy Requirements and Carbon Consumption to Gas Effectiveness

is utilized by passing gas through a layer of coke or coal, where the regeneration of the carbon dioxide is completed.

This system of gas regeneration, although requiring considerable experimental research, now works with a stability which may be compared with the even working of the ordinary electric globe.

Fig. 2 illustrates the principles of the process used by A/S Norsk Staal. Regenerated gas enters the kiln at a temperature of about 2000 deg. Fahr. and passes over the ore coming in from the other end of the rotating barrel, previously heated to about 1700 deg. Fahr. The gases leave the kiln at a temperature of about 1500 to 1700 deg., the sensible heat being utilized in a recuperator in heating the gas which is to enter the regenerating furnace. Thus reduced in temperature to about 400 deg. Fahr., the used gases are purified before entering the storage bell. When required, the stored gas then passes through the recuperator, where

it is preheated to 1100 to 1300 deg. Fahr. and is again sent through the high-tension regenerative furnace.

Ore from the pit is crushed to about  $\frac{1}{2}$  in. and in this form treated in an oxidizing atmosphere at about 1650 deg. in a rotating kiln, before entering the reducing kiln. After cooling, the treated material is crushed and the iron produced is separated from the gangue.

#### Treatment of the Gas

The apparatus shown in dotted lines in Fig. 2 as an addition to the gas circulating system, although not used in the experimental plant at Trondhjem, forms an important part of the process, when operating on a commercial basis. It is a well known fact that the reducing gases, working in a rotating kiln, are only 15 to 17 per cent efficient; that is, the gas leaving the reducing chamber consists of 75 to 80 per cent reducing components. The utilized gases are returned to the regenerative system. It is, however, necessary to get rid of the oxygen from the ore and the carbon added for the reduction. Excess gas can of course be burnt and the heat utilized for some purpose, although the

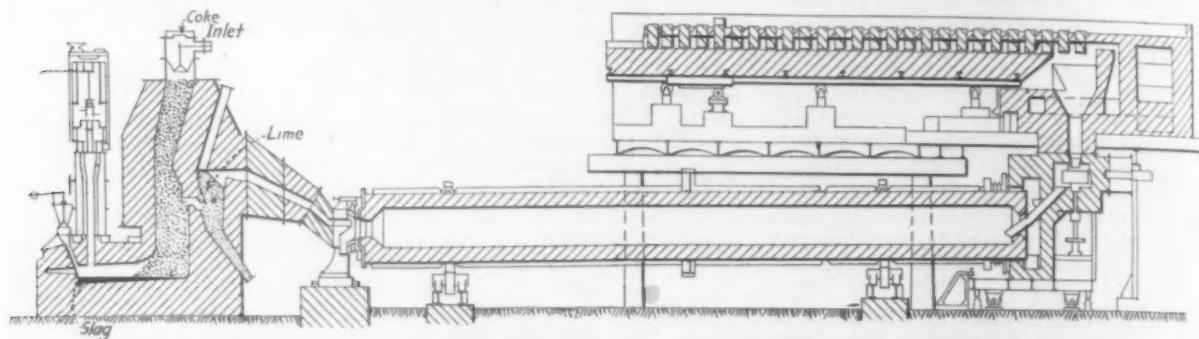


Fig. 5. Section Through the Experimental Furnace Illustrated in Fig. 6. The high-tension electric furnace and gas generator at left differ in detail from those shown in Fig. 1. Both the gas head, at left end of the rotating kiln, and the charging head, at right, are patented forms of air locks

gas is too valuable to be dispensed with in such a manner. The principles to be followed in the further utilization of the valuable spent gases were derived from experiences gained in the Haber process of synthetic ammonia production.

If a gas, consisting of carbon monoxide, carbon dioxide and hydrogen along with water vapor, passes over a specially prepared iron sponge, the carbon monoxide will reduce the water vapor and practically totally be reverted to carbon dioxide, while a corresponding quantity of hydrogen is formed. If, for instance, a gas consisting of 25 per cent hydrogen, 15 per cent carbon dioxide and 60 per cent carbon monoxide, along with a suitable quantity of water vapor, is passed over the previously described catalyst, the gas leaving the apparatus will consist of 52 per cent hydrogen and 46 per cent carbon dioxide and a couple of per cent of carbon monoxide. The carbon dioxide is easily removed from the mixture by means of regenerative absorption in compressed water, and the hydrogen is returned to the circulating system.

Only 10 to 15 per cent of the circulating gases need be treated in this manner to get rid of the excess oxygen. Practically 100 per cent efficiency for the carbon used is obtained in this way. The addition of hydrogen to the reducing gases has proved very valuable. The steam is generated by the heat in the products from the kiln while cooling, and the contact process over the iron sponge is in itself exothermic, no heat having to be supplied. The apparatus required has been effectively standardized in the synthetic ammonia process, and is simple.

Figs. 3 and 4 show how this contact apparatus for secondary gas circulation affects the consumption of carbon and electric current. In Fig. 3 the gas circulating in the main system, calculated in cubic meters per gross ton of iron produced, is used as abscissa; carbon consumption and electric energy required are used as ordinates. The two upper graphs, for energy and carbon respectively, show the conditions for gas circulation as used in Trondhjem; the lower graphs, the same relations when 10 per cent of the gases are

treated in the contact apparatus. While in the first instance the carbon and energy consumption largely depend on the utilization of the gases, the consumption, when 10 per cent of the circulating gases is treated in the contact apparatus, is materially lower. Further, the power and carbon required are practically made independent of the gas efficiency.

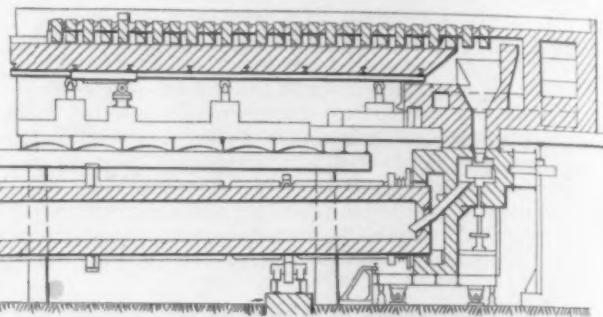
CO

In Fig. 4 the ratio — at the exit of the gases CO,

from the kiln is used as abscissa. This figure clearly shows that a change in the gas ratio from 2.8 to 5 results in only a small increase in the consumption of electric energy, while the carbon requirement drops somewhat.

#### Course of the Experiments

When the research work was begun at Trondhjem in 1920, it was carried on for four months during the summer, when hydroelectric power was available. The first thing to be tried out was the regenerative gas system. In 1921 a vertical shaft furnace was intro-



duced, to study the system while using rich German ores. Several metallurgical difficulties presented themselves.

Few ores proved stable under reducing heat treatment. Thus, several ores were pulverized high up in the shaft and obstructed the passage of the gases. Others sintered together at a temperature around 1500 deg. Fahr., and, after the furnace had run for a few weeks, the material would even adhere to its lining. Mr. Edwin states that, in spite of the difficulties encountered, the shaft furnace may be used when certain suitable ores are treated. The rotating kiln would evidently serve the purpose far better in most cases, and such a furnace was built in 1922, the experiments to be carried out the following year.

For four summer months attempts were made to reduce fines of Norwegian origin. The result, however, was negative, many difficulties arising, the worst of which was sintering of the material, fusing to the brick lining. This trouble—encountered by all who have tried to solve the problem of gas reduction of iron ores—probably constitutes the main reason for the many failures.

Analyses made in the laboratories at Trondhjem during the winter 1923-24 showed that three or four different types of sintering in various complicated relations took place. It was decided that fines could be used only after preliminary sintering treatment. Attempts made in 1924 proved that it was technically possible to reduce fines with gas in the kiln, provided the material had been subjected to a light sintering process. To attain more economical results, however, it would evidently be necessary to use cheaper and more suitable raw materials, and it was decided to revert to the initial plan of working with untreated ores, as they were taken from the mines.

#### Limitations of a Miniature Plant

The experimental plant at Trondhjem was a small one. The well known fact that the thermal efficiency of a minor plant is but a fraction of that of a similar construction of large capacity had to be considered.

To be able to estimate the economical possibilities for a furnace working on the ordinary industrial scale, calculations were made previous to the experiments. It was figured that, for a production of 140 to 180 lb. per hr.—the capacity of the plant at Trondhjem—the energy consumption would be 5420 kwhr. per gross ton of iron produced, while a production of 2 tons per hr. would give a figure of about 2200 kwhr., the secondary gas circulation through the regenerative contact apparatus not being considered in either case.

During an official trial run of two weeks' duration in 1925, controlled by several authorities, the power consumption averaged 5340 kwhr. per gross ton of iron produced. This close result indicates that the theoretical calculations were reliable. It may safely be stated that the electric energy required for a plant of 3 tons iron production per hr. would be about 2000 kwhr. per gross ton of iron produced, this figure including power for all auxiliary machinery as well. The consumption of electrodes is negligible, amounting to only a fraction of an ounce per ton of iron.

"Dunderland" ore was used during the official trial. This is of Norwegian origin, containing about 35 per cent iron, as hematite and magnetite in about even proportions. Sulphur analyzes about 0.1 per cent; phosphorus, 0.3 to 0.4 per cent. Coke and crude oil, in the proportions of 7 to 3, served as reducing agents, the latter being added to the circulating gases in the high-tension regenerative electric furnace. The consumption of reducing agents was determined to be 33 per cent by weight of iron produced. The ash content of the coke, which was weighed moist, was 10 per cent. It is estimated that industrial production will result in a demand for reducing agents—coke and crude oil—of 23 per cent of the weight of iron sponge only.

Hundreds of analyses of the finished products were made, showing the following percentage figures for maximum, minimum and average:

	Maximum	Minimum	Average
C.....	0.491	0.105	0.26
S.....	0.02	0.01	0.011
P.....	0.026	0.003	0.016

Calculations have been made for a plant at a fjord in Norway, the capacity to be 25,000 gross tons of iron sponge per year. Figures, in Norwegian currency, for the cost of production per gross ton of iron are given in Table I, with translation at 26c. per krona.

Table I—Cost of Producing Iron by Gas Method

	Kr.	
3 tons of iron ore at Kroner 5.00.....	15.00	\$3.90
2000 kwhr. at Kr. 0.005.....	10.00	2.60
400 lb. coke at Kr. 36.00 per ton.....	6.50	1.70
110 lb. crude oil at Kr. 100.00 per ton.....	5.00	1.30
55 lb. lime at Kr. 20 per ton.....	0.50	0.13
220 lb. coal (smalls).....	2.00	0.52
Salaries and wages.....	3.75	1.00
Refractories and repairs.....	3.50	0.90
Briquetting.....	2.25	0.60
Overhead expenses.....	4.50	1.20
Production cost, Kroner.....	53.00	\$13.75
Interest and depreciation of capital, 12 per cent of Kr. 2,000,000 per ton, <sup>240,000</sup>		
25,000	9.50	2.50
Total cost, Kroner.....	62.50	\$16.25

The appearance of the plant at Trondhjem will be

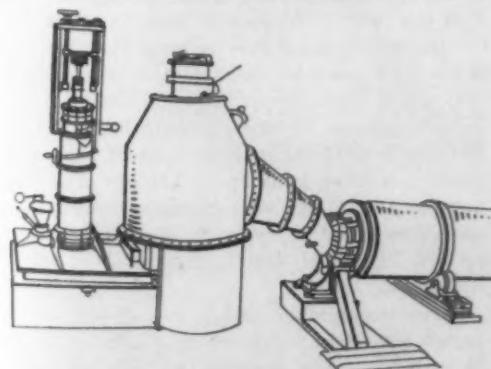


Fig. 6. Perspective of Experimental Furnace, with High-Tension Element at Left, Gas Generator Next and Rotating Kiln Running Off to Right, under the Preheating Furnace for the Ore

seen from Fig. 5. The coke is introduced into the system through an airtight inlet, and passes down a comparatively long shaft before reaching the hot zone. Due to the intense heat of the gas coming from the electric furnace, the slag in the coke melts, collects in the bottom of the apparatus, and is tapped off at intervals. The hot gases are cooled while carbon dioxide is reduced.

Before entering the kiln, the gases pass a layer of lime, where the sulphur present is removed. The rotating kiln is 33 ft. long, and lined with firebrick to an internal diameter of 26 in. The gas locks at the kiln heads are patented. The charging head may be removed easily to make it convenient to inspect the interior of the kiln, in case of trouble. The preheating furnace is intended to be of the rotating type as well, but the space available at Trondhjem forced the adoption of another system for the temporary purpose.

Magnetic separation of the reduced and crushed iron

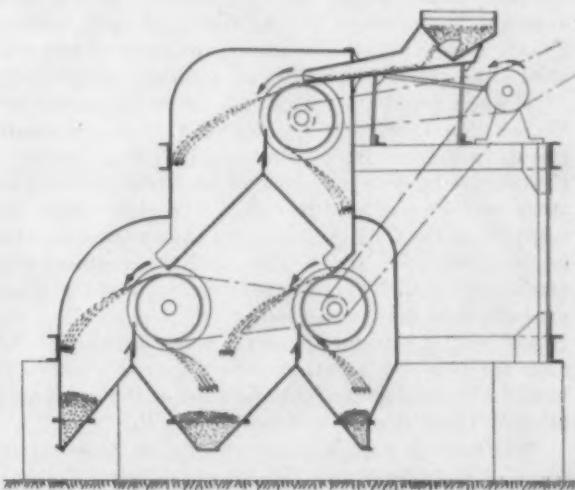
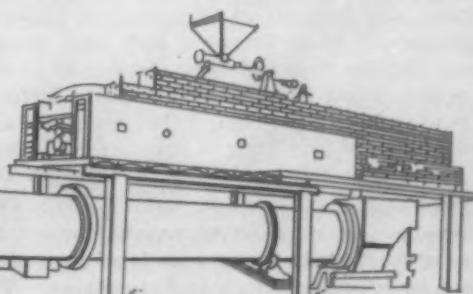


Fig. 7. Principles of Magnetic Separator, with Feeding Apparatus at Top. Initial separation takes place on the upper wheel; secondary separation of concentrated iron sponge on the right lower wheel and of gangue at left

sponge from the gangue was not satisfactory, and other means for the purpose had to be developed. Instead of gravity, centrifugal force was utilized, the rotating barrels being given a speed of 600 to 700 r.p.m. The capacity was thus enormously increased. The whole construction was inclosed in a casing, as shown in Fig. 6. Even fractional separation is made possible; pure iron separates into one pile, gangue into another, while a mixture of both is gathered in a third place for renewed treatment.

The process of gas reduction of iron ore, as solved by A/S Norsk Staal, involves a system of complete mechanical automatic operation. No direct handling is required, the material being automatically brought from storage and treated, and briquetted iron sponge delivered, without any manual assistance whatsoever.



# Future of French Steel Exports

Crude Steel the Main Item—Scarcity of Labor and Coal  
Hampers Development of Finishing Industries—  
Overseas Shipments Through Belgium

BY PAUL M. TYLER\*

**F**RANCE exports heavy steel. Since other French manufactures are typically of the dainty or exquisite sort—fine perfumes, dainty garments, and the thousand-and-one tasteful confections that comprise the list of “articles of Paris”—it is something of an anomaly to find that, in the iron and steel industry, France makes to sell abroad mainly pig iron and crude steel—and even these mostly of a rather cheap quality.

In the Center, the industry is more in keeping with French traditions. Tool, alloy and other fine-quality steels, including all of the crucible steel output of France, are made in and about Creusot, St. Etienne and other well-known localities in this region. And clustered about the steel mills are the various factories that produce much of the French output of automobiles, machinery, artillery and sundry tools. But the Center produces less than 4 per cent of the pig iron and only 14 per cent of the steel products made in France. And even for this small output, which does not suffice for local needs, part of the fuel and most of the ore must be brought from other districts.

The bulk of French production comes from the districts of the North and the East, the latter including former German Lorraine or Alsace-Lorraine, now the French Department of Moselle. In both districts, the industries are based upon the huge deposits of low-grade ore which, though called contemptuously at first by the French diminutive “minette,” are now recognized as the mainstay of iron and steel production on the Continent of Europe.

Although they furnish virtually 90 per cent of the pig iron and about 80 per cent of the steel, these regions offer little attraction to native workers. The French people are industrious enough and fairly efficient in cultivating the soil, but they do not like either the drudgery of mine and smelter or the hot, heavy work about forge or foundry. Such employments satisfy neither the land-owning instinct of the thrifty peasant nor the artistic sense of the Parisian.

## Labor Largely Foreign

To the much-advertised lack of coal in France, therefore, must be added the further handicap of a deficient supply of labor. The need has always been partly met by employing foreigners. Fully one-half of the 17,640 workers in French mines before the war were Italians, and numbers of Germans and Belgians were employed at blast furnaces and steel works. While many Italians returned after the retreat of the German armies, lately they have been slowly drifting back again to their own country. Poles, “hunkies” and Czechoslovakians are beginning to outnumber the Italians and there is a fair sprinkling of Belgians and Germans, mostly in the skilled occupations. One firm recently reported eleven different nationalities on its payroll and at most works the common labor is no more French than it is in Pittsburgh or Youngstown. The Poles, who are fast becoming the principal labor element, are proving reasonably good workers, but they

are restless and like to shift about and, of course, they do not speak the language.

## Production of Iron and Steel Greater Than Pre-War

In 1913, about 21,000,000 tons of iron ore was mined in France (about one-third of which was exported) and about the same amount in German Lorraine. The combined total, 42,000,000 tons, not only would cover the maximum needs of French blast furnaces but also would provide a margin, equivalent to five or six million tons more of pig iron, to supply Belgium's requirements and part of Germany's. Due to the fact that Germany is using much less Lorraine ore than formerly, French mine output has not regained its pre-war volume.

But the output of pig iron, even after allowing for all changes in the customs frontier, was larger in 1926 than in 1913—although even the high record of 815,694 metric tons in October, 1926, was still short of the reputed capacity of more than 1,000,000 tons monthly. Steel production has grown even more substantially, having increased fairly steadily to 741,748 tons in October, which is fully 25 per cent more than the combined output of France and German Lorraine before the war. Under the Continental Steel Trust agreement, France has secured the favorable allotment of 780,000 tons for herself and 145,000 tons for the Saar, out of a monthly quota of 2,500,000 tons for all the original contracting parties.

Both spiegeleisen and ferromanganese are made in France, but largely for home consumption. The former is made mostly in the East and Alsace-Lorraine and the latter mostly in the North and in the Southeast, which regions also account for the bulk of the ferrosilicon, ferrochrome, and other electric furnace ferroalloys, both for local use and for export.

## Quality of French Iron and Steel

Owing to the preponderant use of Lorraine ore, virtually 90 per cent of all French iron (*fonte*) is high in phosphorus. About 1,250,000 tons of it is foundry iron, most of which contains 1.60 per cent phosphorus and otherwise resembles (English) Cleveland No. 3 and, in fact, some of the Virginia iron formerly used extensively in American foundry mixtures. Silicon, however, usually runs high; though nominally about 2.50 per cent, it frequently rises to 3 per cent or more.

Minette is used for making foundry iron, but ordinarily it must be sweetened or diluted with Swedish ore, which has a lower phosphorus-iron ratio. Thomas iron, however, is the characteristic French product. Since it is used for making steel by the basic Bessemer process, it often runs up to 2.50 per cent of phosphorus (at least 1.75 per cent being necessary to prevent a cold blow) and is typically high in manganese (1.50 to 2.50 per cent) and usually also in sulphur, silicon being low.

Iron containing under 1 per cent of phosphorus forms less than one-tenth of the total French output. It is made from Spanish or Swedish ore in Alsace-Lorraine and in the East and North, but the bulk of it comes from the Center, the Southeast and the South-

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west and the West, where it is made partly from imported and partly from local ores. This so-called hematite iron is used chiefly for foundry purposes at home, and for export. Only a small amount is used for making steel. It may be noted, however, that the same French term, *fonte d'affinage*, is applied both to iron used in puddling works and to that employed in the open-hearth (*affinage sur sole*).

#### Lorraine Ore Governs Steel Character

French steel likewise exhibits the controlling influence of Lorraine ore, more than two-thirds of the output and a much greater proportion of the exports consisting of Thomas steel. This fact is of special significance because of the prejudice—particularly in English-speaking countries—with regard to Bessemer steel and especially with regard to basic Bessemer steel, which, due to the nature of the process, may occasionally vary widely in phosphorus.

A trifle more than 30 per cent (even less in 1926) of French steel is open-hearth—mainly basic open-hearth (Martin). About 1 per cent is acid Bessemer and about the same amount is electric. Cheap power (\$13

per kw.-year in some cases) has encouraged the healthy development of electric furnace production, which already has cut in half the crucible steel output. But the extravagant claims that this method would supersede the older processes have now subsided.

Rails and heavy shapes, which are made mostly in the East and Alsace-Lorraine, are both mainly Thomas steel. Merchant bars and light sections were formerly divided nearly equally among open-hearth steel, Thomas steel and wrought iron. Since iron bars were made principally from bushed scrap, the price was scarcely higher than that of steel bars. Now, as bar iron production has fallen off, a much larger fraction of the bars is of Thomas quality.

About four-fifths of the sheets used to be open-hearth (at least, before the war), a distinction being made between fine and ordinary (Thomas) sheets. In point of tonnage, sheets and plates outranked all French finished products except bars and shapes, but the pre-war output of 600,000 tons was quite small when compared with British or German production, for example. Even now, although France has developed a substantial surplus of plates and black sheets, the bulk of the tin plate is still imported. Springs, especially railroad springs, appear in the exports, but these, like most of the forgings, are not made from Thomas steel.

#### Home Market Growing but Still Small

Home consumption in 1913 accounted for about 820,000 tons of foundry iron, but only 4,370,000 tons of steel. At present the home market for steel seems to have grown to between 7,000,000 and 8,000,000 tons—about 2,000,000 tons more than the most carefully calculated estimates of a few years ago. [The estimate reaches about 400 lb. per capita, or nearly half that of the United States.]

Part of this increased consumption has been absorbed in the manufacture of machinery. The "flight from the franc" has stimulated the investment of capital in permanent equipment, with the result that sales of industrial machinery, for example, have increased 150 per cent over 1913. Moreover, imports in this class, which formerly exceeded exports by 50,000 tons, are now about the same in tonnage (75,000 to 80,000 tons annually), although about 50 per cent higher in value than the exports.

While the principal gains in exports of industrial machinery have been in textile, flour-milling and metal-working machinery, the increases are fairly well distributed throughout the whole list. An even better record is shown for the machinery group as a whole, including electrical machinery, steam boilers and allied equipment. For this group, which does not include hardware or tools, exports increased from 82,000 tons in 1913 to 172,000 tons in 1925, and this despite the fact that the machinery trade of other European countries has fallen off.

In most lines of tools and metal goods—always important outlets for French steel—both home con-

*CONTINUING the series of studies on the steel capacities of European countries, and particularly on their ability to export into the markets of the world, this article on France points out the characteristics of the French steel industry with which the outside world comes into contact. Contrary to the experience in other French industries, this one sends abroad mainly the semi-finished material, or that on which the labor item is relatively not large. It is along these lines, therefore, that American manufacturers will have to watch competition from France.*

sumption and exports have been well sustained or increased. The demand for foundry iron, which was relatively good even before the war, has been greatly enlarged by the deLavaud process for making centrifugally cast pipe. French engineers estimated that 700,000 tons of this pipe could be sold in the United States alone and, if this estimate is a trifle optimistic, French pipe foundries are at least fast developing a nice export business.

#### Must Export Heavy Tonnages

Despite these various extensions in home demands, the essential fact persists that the home market can never consume anything like the tonnage of steel that France can produce. The present surplus of pig iron is represented by net exports of about 700,000 tons annually which, at full capacity, would advance to 800,000 tons. Steel production within the present customs area (which includes the 1,750,000 tons produced in the Saar) is already 11,000,000 tons a year, but this tonnage, though it falls short of capacity, has been attained only by exporting more than 8,000,000 tons (in addition to scrap and pig iron) and to a large extent by displacing steel production in other countries, notably in Great Britain.

The population of France, not quite 40,000,000, is composed mainly of small farmers, shop keepers and specialty manufacturers; the per capita consumption of steel is rather small. French colonies, likewise, are not yet capable of absorbing any considerable tonnage. To work at capacity, therefore, France and the Saar must find foreign markets for a large fraction—probably 50 per cent—of their production. This means that they must double their present exports. Already they have secured about one-third of all the net tonnage exported by the leading producing nations—but even this is not enough to keep the mills fully occupied.

The remarkable showing that France has made during the last three years must be attributed in part to currency inflation. French prices have been called "ruinous," but similar claims were made with respect to German steel, not only during the period of mark inflation but also before the war, when the German industry was expanding most rapidly. In France, new and better equipment, which has replaced that destroyed during the war, contributes to the more economical exploitation of the natural advantages. But another factor is that, all along the line and throughout the country (though not so much in Paris), prices and wages have been abnormally low, when measured in dollars.

If France had to import ore from Sweden or Spain, the effects of exchange would naturally be less marked, but fuel is almost the only item that the iron and steel industry has to pay for on the basis of international values. Even in the case of coke—a year or so ago—domestic ovens cut prices so that indemnity coke delivered by Germany had to be sold at a loss or not at all. With the rise of the franc in the latter part of 1926, French prices rose considerably. But it should be remembered that both ore and labor, although they have risen greatly in almost every other country, are still lower in France (in gold) than they were in 1913.

#### Exports Principally Blooms and Billets

As compared with before the war, exports have increased even faster than production. But this statement does not apply to territory annexed from Germany. Formerly, many German firms were "integrated at a distance" to the extent that they produced pig iron and often semi-finished steel in their plants in Lorraine and then worked them up in their steel works and rolling mills in Westphalia.

Under French control, the Lorraine plants have been adding steelworks and finishing departments and, meanwhile, the Ruhr steelworks have been provided with blast furnaces. As both districts are fast becoming more nearly self-contained, it follows naturally that the volume of goods exchanged has grown less. Nevertheless, despite the rapid adjustment to the new frontiers of this over-the-border trade, France has become among the nations of the world not only the one that exports the largest tonnage\* but also the one that imports the least.

Table I gives monthly figures covering imports and exports in 1913, 1923, 1925, and for September, 1926. Throughout 1926 the trade in most respects was similar to that in 1925, although the effects of the British strike began to be felt more definitely toward the latter part of the year and may be carried over well into 1927. Since comparisons with pre-war are of little real value, because of the great changes in the frontier, a better idea of recent developments may be gained by comparing the data for 1925 or 1926 with those for 1923—although even this comparison is complicated by the fact that the Saar has been included within the French Customs area only since Jan. 10, 1925.

To facilitate comparisons, the classifications in the table have been slightly condensed. According to the more detailed official tabulations, the main export items in 1926 were, in order of volume, rolled blooms and billets, foundry iron, rails, rail chairs, structural shapes, uncut hot rolled sheets, and wire. Blooms—doubtless mostly open-hearth (Martin) steel—also led in the list of imports, tin plate being second.

Exports of rails which, though still small, had increased six-fold in 1913 as compared with 1900, have now reached substantial proportions. Exports of beams and heavy shapes took a sudden jump immediately be-

fore the war and have since registered a large advance. Tool steel is another specialty that is being exported now in much larger quantities.

Scrap, though not included in the accompanying figures, has formed an important item in French trade. Since less than 5 per cent of scrap can be conveniently worked up in the ordinary 25-ton basic converter, the heavy croppings from the Bessemer plants in Lorraine and Luxemburg formerly constituted the chief source of scrap supply for open-hearth furnaces in Westphalia. But in 1922 the French government placed an effective embargo upon scrap exports, thereby increasing home consumption. While export licenses were frequently obtainable for shipments to Italy or Great Britain and even to Germany, the exports have virtually ceased. During the first six months of 1926, for example, the reported consumption of scrap was equivalent to 23.4 per cent of the total French output of steel and, since only 26 per cent of this total consisted of open-hearth steel, it is clear that the bulk of the latter is now made from scrap. Very little acid pig iron is reported as consumed in steel making.

#### Markets Mainly Nearby

Only during the last two years has France encroached much upon markets in South America or

Table I.—Imports and Exports of France, 1913, 1923, 1925 and 1926

(Monthly Averages in Thousands of Metric Tons)

Commodity	1913		1923		1925		1926	
	Im- ports	Ex- ports	Im- ports	Ex- ports	Im- ports	Ex- ports	Im- ports	Ex- ports
Pig iron*	2.7	8.3	4.2	49.3	2.7	58.9	1.6	60.1
Ferroalloys*	1.5	1.0	1.5	1.3	1.6	0.3	4.1	0.4
Blooms, billets, and bars...	1.6	26.1	21.1	76.1	2.3	173.2	4.0	143.8
Wire rods...	0.6	0.2	3.5	4.3	0.5	9.0	0.5	11.1
Plates and sheets ...	3.2	0.7	13.6	3.8	4.0	14.4	2.2	19.6
Hoops and strips ...	0.3	0.3	7.5	1.5	0.5	2.9	0.3	3.4
Rails ...	0.1	6.3	3.7	20.5	0.1	20.1	0.2	29.1
Wire ...	0.5	0.5	0.9	2.9	0.3	4.6	0.2	3.6
Pipes and tubes	0.7	0.5	2.5	1.6	0.7	5.8	0.6	4.2
Other items†...	2.9	8.6	1.0	21.5	1.2	37.8	1.1	40.3
Total ...	14.1	52.5	59.5	182.8	13.9	326.8	14.8	316.2

\*Spiegeleisen generally is included with pig iron.

†Does not include scrap.

in the Far East. Even now, from 30 to 50 per cent of the pig iron exports are to Belgium or Luxemburg, 15 to 20 per cent to Germany, and the bulk of the remainder to other European countries. Great Britain has been a large but sporadic buyer; Italy has been taking more and more; and Switzerland has always been a good customer. The Saar, which is now part of the French customs area, consumes about the same amount of French pig iron as Germany. Significant quantities are shipped also to the French colonies in northern Africa.

Great Britain, Germany, Italy and Switzerland also account for most of the exports of semi-finished steel and bars and, except for occasional substantial shipments of rails to Japan, for all finished steel. The lighter finished products are naturally more widely distributed, but even they are exported chiefly to countries not far away, including, in addition to those already mentioned, especially the Netherlands and Scandinavian countries, although the trade with South America, notably with Brazil and Argentina, is growing.

Because of the preponderance of bulky products, transportation constitutes an important factor in the French export trade in iron and steel. There is a small industry on the shores of Normandy, and even the northern district is fairly close to the sea, but the bulk of the exports originate in Lorraine, which is rather badly situated for shipping overseas. While the entire area is well served by local waterways and

\*She was exceeded, in 1926, by Germany.

canals, there is no practicable all-water route to tide-water. Even the canal from Thionville, the center of former German Lorraine, could never be used extensively for through shipments, traffic to and from Westphalia having always been mainly by rail.

Dunkirk, the nearest French port, is 217 miles from Longwy and over 250 miles from more remote parts of the district. The proposed canal connection to this port is now considered impractical. Normally exports are shipped by way of Antwerp. Although there is some inward movement of coal from Belgium by canal, both steel and ore are shipped from France by rail and, for the present at least, the French do not enjoy the preferential freight rates extended to Belgian steel firms.

One of the disadvantages of shipping through even a friendly foreign port is that the steel loses its identity—even the French customs regulations do not permit the reimportation of domestic goods shipped by way of Antwerp to French coastal points or to the colonies, except as foreign produce subject to regular duties.

#### Markets Are Chief Concern

Now that the fuel problem is in the background for the time being, French ironmasters are busied chiefly in selling their products. To profit by the exploitation of the huge masses of iron ore which have become virtually a French monopoly after the Treaty of Versailles, they have a choice of several expedients. The simplest is (1) to export ore; but since the ore, though cheap, is excessively bulky, a part of it will naturally be made into pig iron, which may be either (2) exported as such or, after being converted into steel, exported in the form of (3) semi-finished steel or (4) finished steel. There is even another alternative

(5) to export fabricated goods including both (a) such simple products as cast iron pipe and (b) highly manufactured products, such as machinery and tools.

In all five of these departments France has registered remarkable progress. Instead of the essentially simple exchange of French ore for Westphalian coal, there is now a new and complicated economic as well as political division. Since blast furnaces have been built in the Ruhr and since they are supplied more and more by higher grade ores, Germany no longer requires to import from Lorraine so much ore, pig iron or semi-finished steel as formerly.

Not only France but also the Saar and Luxemburg are all involved in this new condition that has been brought about by the duplication in present Germany of equipment which, though not now owned by Germany, still exists. On the other hand, France and the Saar, having made their works more nearly integrated, are less in need of German machinery and finished products.

Recently Franco-German relations, including those of Luxemburg and the Saar, have been largely harmonized by means of agreements. Specified French exports are admitted into Germany under favorable terms—part of those from the Saar being free from duty—while Germany is accorded “most favored nation” treatment with respect to specified imports into the Saar. These relations are further fortified by unofficial relations within the international steel entente.

Since the limits of the German market are now fairly rigidly fixed, the main stream of French exports must flow outward through Belgium—much of the ore and pig iron as well as some of the semi-finished steel being worked up in transit.

## RUBBER LINED STEEL DRUMS

### New Process Makes Metal Container for Acids Substitute for Glass Carboys

THE application of a vulcanized rubber lining to metal, to which the rubber is firmly welded, is being accomplished with a vulcanizing process developed by the Miller Rubber Co., Akron, Ohio, which has adopted this process in the manufacture of rubber-lined steel drums. This development broadens the field for steel containers, as the rubber-lined containers are now being made to take the place of glass carboys for handling acids. A new rubber compound is used in connection with the process, which is claimed to be particularly adaptable in making a lining for steel drums and also for steel storage and transportation tanks. The drums were developed primarily for the shipment of muriatic acid and other corrosive acids, but can be used as containers for various other chemicals, being resistant, it is claimed, to solutions of practically all inorganic salts, whether neutral, acid or alkaline, and to all concentrations.

The drums are made by the Republic Steel Package Co., Cleveland. After the shells are completely formed and the openings are installed, but before the heads and bottoms are put on, they are sent to the Miller plant for the application of the rubber coating. Then they are returned to the Republic plant, where the rolling hoops are attached and the heads and bottoms are double seamed in place. The design and construction of the drum follow standard practice, although some minor modifications of the dimensions are made to take care of the interior coating. The side seams of the shells are welded, but no welding is done in the final assembling after the rubber lining is applied, as the heat would injure the lining.

The opening in the drum has hard rubber sleeves, which are reinforced with a steel core. The core is incased in unvulcanized rubber and the sleeve is then

placed in a mold and vulcanized. The sleeve is flanged on one end and threaded on the other. It is slipped through a hole in the drum from the inside and the flange is drawn tightly against the rubber lining of the shell or head by means of a lock nut made of acid resisting bronze that is screwed on to the threaded part of the sleeve on the outside of the drum. The lock nut covers the sleeve and protects it from injury. The sleeve forms a hard rubber bunghole, which is closed with a rubber covered pipe plug, which screws into the threads on the inside of the sleeve, where it seats against a flange. The plug when inserted is below the lock nut, so that it is not likely to be damaged in the handling of the drum. All joints are sealed with gaskets to prevent the seepage of liquids under the sleeve. One opening is provided in the head and another similar in construction on the side of the drum. The design of the openings was developed by the Miller Rubber Co. and is covered by patents.

The rubber lining is applied in its unvulcanized state, several layers of which are built up on the interior of the drum, one layer at a time. The rubber is extremely sticky, this quality being necessary to weld the rubber to the metal and to assure perfect adhesion between the individual plies. As the rubber is soft and plastic, it is readily molded to the shape of the drum. After the drum is lined, the rubber is vulcanized, changing it from a plastic to a tough elastic coating and it is stated that it becomes so thoroughly welded to the steel that it cannot be removed except by cutting it off with a knife.

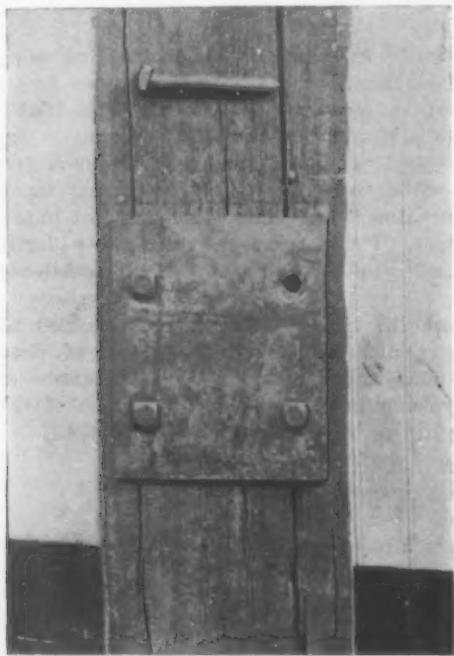
The drums are made in 55 and 30 gal. sizes of 14 and 16 gage steel, respectively. Advantages claimed for the rubber-lined steel drum as compared with glass carboys for handling acids include saving in freight, less labor in handling, less breakage and a saving in storage space. The 55-gal. drum weighs 125 lb. and the 12-gal. carboy weighs 60 lb. Consequently the tare weight of carboys holding 55 gal. or the same amount of material as a 125-lb. drum is 275 lb.

## REINFORCING FLOOR BEAMS

## Steel Plates Used as "Lower Flanges" Under Heavy Timbers

IN increasing its manufacturing facilities, the Parker Wire Goods Co., Worcester, Mass., has had occasion to strengthen a considerable number of wooden floor beams which will support a second floor in a steel-framed building formerly occupied as a foundry. The method employed departs from usual practice. The beams are thoroughly seasoned Southern hard pine, 12 by 12 in. in section and approximately 20 ft. long. The conventional method of strengthening is to fasten reinforcing of steel or wood to the sides.

This the engineers believe does not utilize the new material to best advantage. The top of the old beam,



*Application of Steel Plate to Under Side of Floor Timber to Reinforce It. This test piece demonstrated that lagscrews in sound Southern pine timber will resist a lateral pull or thrust of 5000 lb. Above the plate is a lagscrew bent in pushing the plate along the timber. The line across the timber above the plate shows the latter's position before the pushing process started.*

which is under compression, is amply reinforced by a 3-in. plank flooring overlaid with maple flooring. But its bottom, which is under tension, is a weak part. The Parker company has bolted a flat steel plate to the bottom of each beam. While available steel plates were ordered and applied without delay, laboratory and shop tests were made to check up on the theory, under the direction of Edward D. Priest, president of the company.

The exact length of beam is 19 ft. 11 1/4 in.; the distance between supports 19 ft. 3 3/4 in.; dimensions of steel plate bolted to the bottom of the beam, 12 ft. long, 10 in. wide and 1/2 in. thick. Each plate is bolted to its beam by 22 unfinished lagscrews 3/8 in. in diameter and 6 in. in length. These are well distributed along the two sides of the plate, with center of holes 1 1/2 in. from edge of the plate. The holes in the plate are punched with 13/16-in. punch and are tapered to 25/32 in. diameter, the small diameter being placed next to the beam. The plate was used as a template in drilling in the beam 3/8-in. holes 1 1/8 in. deep, equal to the unthreaded length of lagscrew, and then 19/32 in. in diameter, equaling the threaded length of lag-screw and its diameter at root of threads.

The full strength of two men was applied in turn-

ing the lagscrews into place, using a wrench 14 1/2 in. long from center of lagscrew to point of applied force. This gave a rough test of the soundness of the wood. Threads stripped in the wood of one beam and the beam was replaced.

A light shop test was made of a new and more or less green Southern hard pine beam of similar dimensions. The weight of beam was 1200 lb., weight of steel plate 204 lb., and live load at center of beam 5262.5 lb. The deflection without the steel plate was 0.4392 in., and with steel plate, 0.251 in.

Tests of the holding power of the lagscrews were conducted by Prof. Francis W. Roys, of the Worcester Polytechnic Institute, who pushed off laterally a steel plate bolted to a short length of one of the old wooden beams to be reinforced. The 12 by 12-in. section was 41 in. long, the 1/2-in. steel plate was 10 in. wide and 12 in. long, the four lagscrews 3/8 in. by 6 in. As shown in the accompanying illustration, the lagscrews were placed at the corners of a rectangle 7 in. apart on centers crosswise of the beam and 6 in. between centers lengthwise of beam.

## Load Test Demonstrated Holding Power

The load was applied centrally on the 1/2-in. edge of steel plate in a direction parallel to the length of the beam. The maximum load applied was 45,000 lb. The lagscrews were bent just under the plate at point of entering the wood and at the point of termination of threads on the screws. The plate remained in tight contact with the beam, showing high holding power of the threads in the wood.

Readings were taken for each additional load of 1000 lb. above 5000 lb., or a total of 40 readings, and a curve was plotted showing the movement of the plate along the beam for each reading.

At a load of 5000 lb. the movements of 0.037 in. was indicated, and at 16,000 lb., 0.048 in. Above 16,000 lb., at which joint a rather abrupt change occurred in the direction of the curve, it runs approximately in a straight line to 33,000 lb., where the reading indicates a total movement of 0.103 in. Here a second abrupt change occurred, indicating pronounced yielding and incipient rupture of the timber. Above this load a slight snapping of the timber was occasionally noted, and at 45,000 lb. it split longitudinally along the line of the lagscrews. At 41,000 lb. the total movement indicated was 0.270 in.

## Limitations and Cost

The test indicated to the engineers that one lag-screw of these dimensions, when used as described in reinforcing, will resist, with a fair margin of safety, a lateral pull or thrust of 5000 lb. Lagscrews would not hold in rotten wood, of course, and probably would not hold so well in green as in dry wood. The deduction reached is that a steel plate as described, fastened with these lagscrews, has a strength in tension much in excess of the holding power of the screws.

Probably, it is believed, a more economic use of material would be to use a plate 3/8 in. thick and 10 in. wide, with a larger number of lagscrews. To secure the best possible distribution of lagscrews, it would probably be advisable to make the steel plate 14 ft. or even 16 ft. long. The cost of the reinforcing as done by the Parker company, for labor and material, was approximately \$12 per beam.

Stores of bituminous coal in the hands of commercial consumers are reported by the Bureau of Mines to have been 55,000,000 tons on Jan. 1. This is the largest tonnage shown in about three years. It compares with 43,000,000 tons on Oct. 1 and with 49,000,000 tons on Jan. 1, 1926. Production of bituminous coal continues at a high rate, according to the Bureau of Mines. The three weeks ended Feb. 5 showed an average of 13,537,000 net tons, the largest being less than 1 per cent above the smallest. For the coal year to date, the total on Feb. 5 stood at 499,984,000 tons, compared with 456,696,000 tons a year ago.

# Rolling Mills at Sagunta, Spain

## Reversing Blooming Mill, Three-High Rail and Structural Mill, Plate and Merchant Mills Work Up Ingot Output

BY DR. FRANK C. ROBERTS\*

**D**ESCRIPTION last week of the primary features of an integrated steel mill of the Compañía Siderúrgica del Mediterráneo, at Sagunta, Spain, covered the blast furnaces, open-hearth department and general arrangement of the plant. The present (concluding) installment describes the rolling equipment.

Fig. 4, as well as Fig. 1, shows the general arrangement of the rolling mills. All equipment indicated, except two soaking pits, the 18-in. structural mill and the jobbing plate mill, has been installed and is in service. All mills and auxiliary machinery are electrically operated except in instances where hydraulic power was deemed more advantageous. All buildings are built with pre-cast reinforced concrete columns and crane

from a three-phase, step-down transformer. The direct current exciter generator is 90 kw., 125 volts; this unit also furnishes power for the operation of the automatic controllers for generator and reversing motor fields. There are also two variable potential excitors of 15 kw. each, assembled with this unit.

Three rotary converters, six-phase, self-starting type, each 1000 kw., 550 volts, furnish the power for the auxiliary motors of the blooming, rail and structural and plate mills. The transformers for the converters are oil insulated and air cooled and are provided with two external oil circulating radiators.

Alternating current switching equipment is of hand operated, remote control type, while the direct current

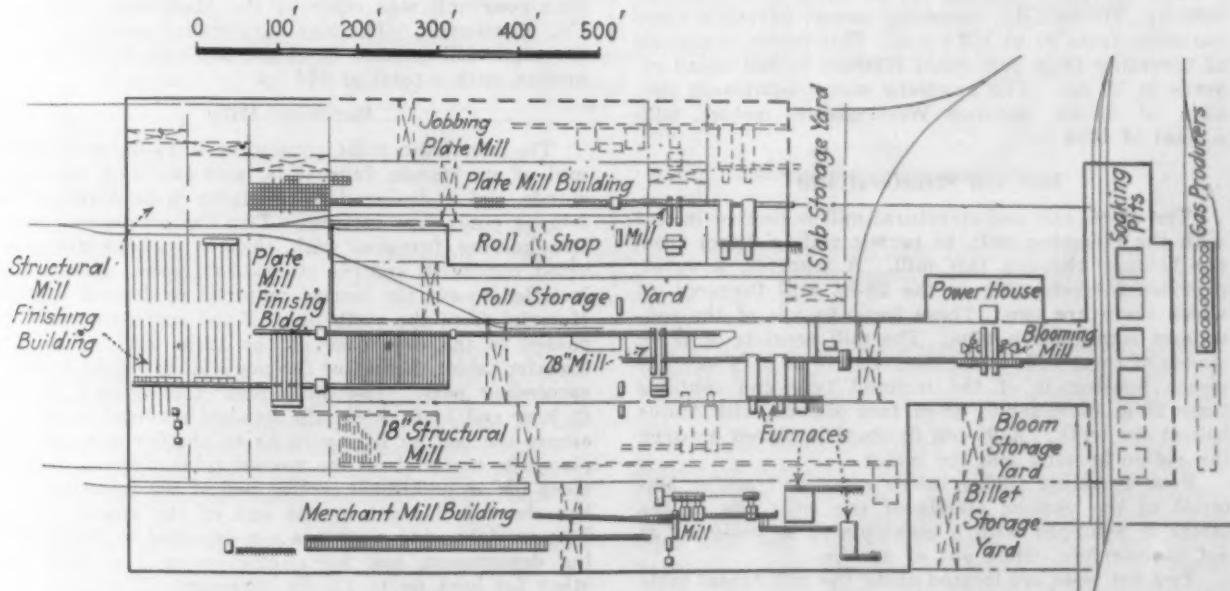


Fig. 4—Layout of Entire Rolling Unit, from Producers, Soaking Pits and Blooming Mill at Right End to Structural Mill Finishing Building at Left. The design provided for minimum movement of material in its progress from ingot to outgoing freight car

girders and steel roof trusses. Railroad tracks enter all buildings at points convenient to the overhead cranes.

### Electric Substation

The electric substation adjoins the blooming mill, the 5250-volt alternating current generated in the blast furnace power house being conducted to the substation by two three-phase lead-covered underground cables. The blooming mill and the rail and structural mill are driven by direct current, generated in a flywheel motor-generator set in the substation. This consists of a 500-hp. wound rotor induction motor, 5250 volts, 368 r.p.m., three flywheels, one 3500-kw., 700-volt generator and one 3000-kw., 700-volt generator. The former generator supplies current to the blooming mill motor and the latter to the rail and structural mill. Shunt field excitation for the reversing mill motors and the 3500 and the 3000-kw. generators on the motor-generator set is supplied by a four-unit exciter set driven by a 180-hp. 500-volt motor. The latter gets its power

switching apparatus consists of single-pole knife switches and automatic circuit breakers.

All equipment in the substation was furnished and erected by the Westinghouse Electric & Mfg. Co. An electric crane covers the area of the substation.

### Soaking Pits

The soaking pits are of the four-hole regenerative type, each hole being 8 ft. 6 in. x 5 ft. 5 in.; the tops of the pits are 8 ft. above yard level. The pit covers are hydraulically operated and so designed as to prevent water, due to leakage, coming in contact with the brickwork. The pits are arranged to be heated by producer or coke oven gas. The crane equipment consists of one 150-ton rope stripper and one 10-ton pit crane equipped with a 13½-ton auxiliary hoist, both made by the Alliance Machine Co. The ingot stripping is done at one end of the soaking pit building. The gas producers are of the hand-poked, water-seal type and are placed parallel to the open-hearth producers. As will be seen in the illustration, the soaking pits lie at right angles to the blooming mill. An electrically operated

\*Frank C. Roberts & Co., Philadelphia.

ingot car transfers the ingots to, and dumps them on, the mill approach table.

Fig. 5 is a section through the soaking pit building, producers, etc.

The hydraulic power pumping equipment is located in a building near the soaking pits; this equipment supplies all hydraulic power except that required for the blooming mill.

#### Blooming Mill

The blooming mill is a two-high reversing mill with rolls 39 in. diameter by 108 in. long; the pinions are 48 in. diameter and 56 in. face, with double helical teeth. The pinion housing is of the inclosed type. The top roll is hydraulically balanced. The mill spindles are of forged steel, 17½ in. in diameter. The mill is furnished with electrically operated manipulators on each side, all parts being above the mill floor. The screwdown mechanism is operated by two 60-hp. motors. The down-cut bloom shear has the capacity to cut sections up to 10 x 10 in. and 40 x 8 in., is driven by a 180-hp. motor and fitted with hydraulic balance for the top knife.

Beyond the shear are two transfers, one for slabs to the slab storage yard and the other for delivering billets and blooms either to storage or to the table leading to the 28-in. mill heating furnaces. A 60-ton crane serves the blooming mill, the crane runway being in line with the crane runway over the 28-in. mill. An independent hydraulic pumping plant supplies the hydraulic power required by the blooming mill.

The blooming mill is driven by a Westinghouse 5000-hp., 700-volt d.c. reversing motor, having a speed variation from 50 to 120 r.p.m. This motor is capable of reversing from full speed forward to full speed reverse in 10 sec. The auxiliary motor equipment consists of 21 d.c. 550-volt Westinghouse motors, with a total of 1405 hp.

#### Rail and Structural Mill

The 28-in. rail and structural mill is located in line with the blooming mill, to permit rolling direct from the bloomer through this mill. A transfer, however, provides for reheating in the 28-in. mill furnaces, of which there are two. These furnaces are of the continuous recuperative type. The mill consists of three stands of three rolls each; the rolls are 28 x 72 in. The pinion housing is of the inclosed type and contains three 28-in. diameter by 48-in. face pinions, with double helical cut teeth. A 90-ton flywheel is placed between the pinion housing and the motor.

Four traveling tilting tables serve to transfer material to the various stands of the mill; one of the tables is equipped with a manipulator so designed as not to interfere, when out of service.

Two hot saws are located along the mill runout table and a cambering machine is placed ahead of the cooling bed. The cooling bed is made in two sections, each 65 ft. wide by 70 ft. long, and arranged to be operated independently of each other. Material may be transferred across the beds either by dogs or straight edges. A runout table delivers material from the cooling beds to the finishing department, a straightening machine for structural material being provided at the end of the cooling bed table. The mill runout table is continued beyond the cooling beds, so that material such as billets, sheet bar, etc., may be conveyed direct to the finishing department without crossing the cooling beds.

A bar shear is placed in the line of the extension of the mill runout table; this shear has the capacity to cut up to 4 x 4-in. cold billets. A billet cooling bed is provided, to cool billets intended for the merchant mills, until such time as the 18-in. mill is installed. The finishing department is in three buildings placed at right angles to the mill building, and is equipped to deal with rails up to 100 lb. per yd., and beams up to 12 in. The mill building proper is served by a 25-ton crane, the runways for which are in line with those of the blooming mill building. This arrangement permits the blooming mill and structural mill cranes to be used for both mills. The 28-in. mill is driven by a Westinghouse 3750-hp., 700-volt, d.c. reversing motor, having a speed variation from 70 to 150 r.p.m. While the mill

is a three-high mill, the reversing motor renders the backing out of cobbles a relatively simple process and also widens the speed range. The auxiliary motor equipment for the 28-in. mill consists of 43 d.c., 550-volt Westinghouse motors, with a total of 1848 hp.

#### Plate Mill

The 36-in. x 111-in. plate mill is a three-high mill. Two continuous recuperative furnaces are provided for heating the slabs produced by the blooming mill and taken from the slab storage yard; a 7½-ton crane serves the latter. Space is provided for a third furnace. Provision is also made for the transfer of large slab ingots direct from the soaking pits to the mill approach table, by means of an electrically operated car equipped with motor-driven rollers. The top roll of the mill is balanced by counterweights. The mill is equipped with electrically operated tilting tables. A straightening machine, made by the Mesta Machine Co., and inspection table are provided, the latter being equipped with a plate "turn-over." Roller chain tables convey the plates to the inspecting table and the end-trimming shear table. The finishing department is supplied with three shears. The building over the mill proper is served by a 40-ton crane and the building over the tables, etc., by a 10-ton crane.

The plate mill is driven by a Westinghouse 3000-hp. wound-rotor induction motor, 5250 volts, 735 r.p.m. Between the motor and the mill there is placed a hercogear unit equipped with two 8½-ton flywheels, which reduces the speed of the mill to 88 r.p.m. This gear unit was made by the Mackintosh-Hemphill Co., Pittsburgh. The auxiliary motor equipment for the plate mill consists of 22 d.c. 550-volt Westinghouse motors, with a total of 686 hp.

#### Merchant Mills

The merchant mills consist of a 14-in. continuous mill of six stands, four 12-in. and two 8-in. finishing stands, and is designed to roll from  $\frac{3}{8}$ -in. diameter to 3-in. or equivalent sections. Two continuous recuperative heating furnaces with electric pushers are provided, one 30 ft. and the other 15 ft. wide. Shears are installed to cut the heated material to desired length. Material from the sixth pass of the continuous mill is passed to the first pass of the 12-in. mill by a "Y" transfer table; thereafter the material is looped to each succeeding pass. The mechanical cooling bed is 300 ft. long and 14 ft. wide; the finished material is moved across the bed by lifting racks to shuffler bars, which place the material on the runout table. Space is provided for an additional cooling bed of the same size. A bar shear is located at the end of the runout table. Two straightening machines are provided in the finishing department, one for angles up to 3 in. and the other for bars up to 1½ in. diameter. The merchant mill building is served by a 15-ton crane.

The continuous 14-in. mill and the 12-in. mill are driven by a 2500-hp. motor and the 8-in. mill by a 1000-hp. motor, the motors being equipped with speed regulating sets and supplied with 5250-volt alternating current. The auxiliary motor equipment consists of 14 d.c. 230-volt motors, with a total of 620 hp.

#### Roll Shop and Storage

The roll shop and the roll storage space are located between the 28-in. mill and the plate mill. The roll shop is 50 ft. wide by 250 ft. long, is served by a 20-ton crane and is adequately equipped to meet the demands of the mills. The roll storage space, 75 ft. wide by 570 ft. long, is covered by a 20-ton crane. Communication for the transfer of rolls to and from the roll shop, the storage space and the various mills, is provided by an underground tunnel carrying a narrow-gage track and car, and furnished with openings in the roof through which the cranes handle the rolls.

The blooming, 28-in. and plate mills were built by John Musgrave & Sons, Ltd., Bolton, England, and the electric equipment for these mills was furnished by the Westinghouse Electric & Mfg. Co., Pittsburgh. The merchant mills were largely built by the company in their own shops, the rolls being furnished by the Pittsburgh Rolls Corporation. The electric equipment for the merchant mills was supplied by the Allgemeine

Elektricitaets Gesellschaft, Berlin, Germany. All cranes in the rolling mill buildings, except those in the soaking pit building, were furnished by the Haarlem-sche Machinenfabriek, of the Netherlands.

The works were designed by and erected under the supervision of Frank C. Roberts & Co., engineers, Philadelphia. The railroad system, foundations, buildings, structural work, platework, general machinery equipment, etc., were built by the company in accordance with detail drawings prepared by the engineers. Units

the company wishes the operating force to be composed ultimately of Spaniards, in consequence of which the above men have also acted as instructors. Messrs. Black and Brown have completed their engagements, and the blast furnace and open-hearth departments are now under Spanish superintendence.

The officials of the company are as follows: Chairman of the board of managing directors, Sir Ramón de la Sota, K.B.E.; vice-president of the board and managing director, Don Luis María de Aznar; secre-

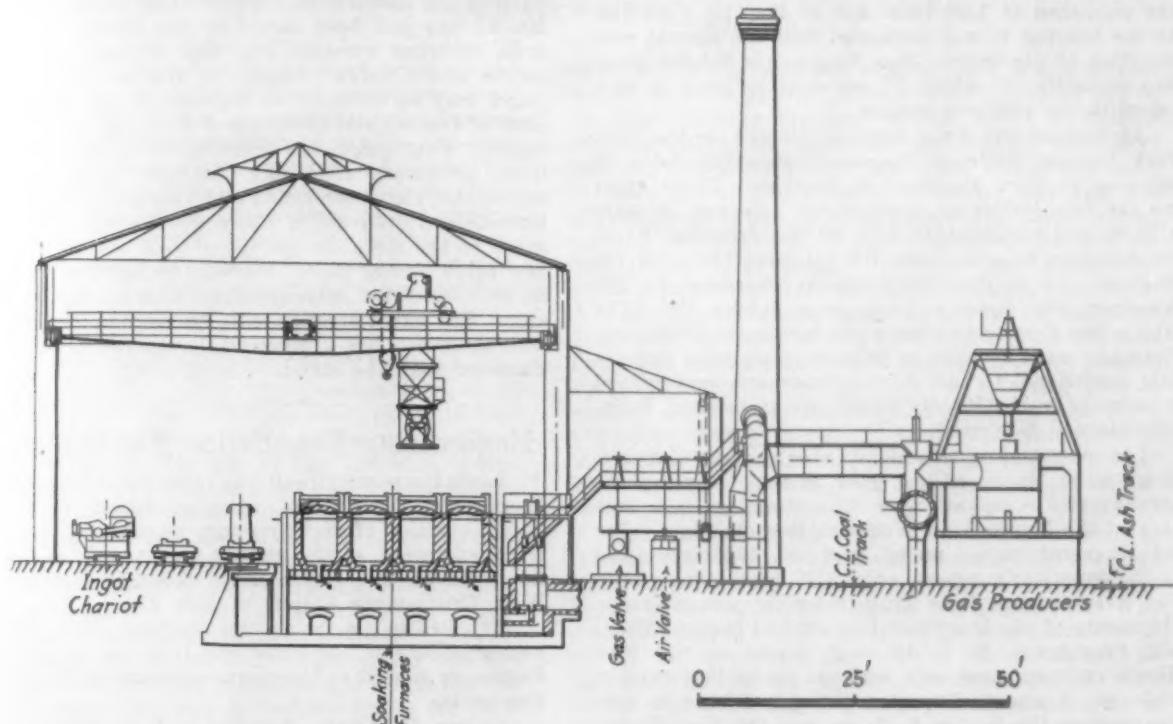


Fig. 5—General Arrangement Section Through Producers and Soaking Pits, with Ingot Chariot at Left. The row of gas producers adjoins a similar, but longer, row serving the open-hearth furnaces, and located beyond the right end of this drawing

such as boilers, steam turbos, pumps, electric equipment, cranes, rolling mills, etc., were covered by specifications and general drawings prepared by the engineers, and upon which proposals were submitted to the engineers by American and European manufacturers. European contracts were placed by the company under the advice of the engineers; American contracts were placed by the latter.

Each of the three main departments of the works was started and operated under the direction of the following Americans, selected by the engineers: blast furnaces, etc., George M. Black; open-hearth plant, William Brown; rolling mills, Anton Getz. Naturally,

secretary to the board, Don Antonio de la Sierra; general director and member of the board, Don Eduardo Aburto; technical director, Don Juan Sanchez Arboledas.

The following engineers have charge of the departments indicated: Coke plant, Don José Carmany; blast furnace plant, Don Manuel de Aguinaga; open-hearth plant, Don Eliseo Belzunce; rolling mills, Anton Getz and Don Antonio Aranzadi; power, Don Angel Santafé; laboratories, Don Francisco Herrero de Egana; shops, Don Juan Roig. The Compañía Siderúrgica del Mediterráneo is affiliated with Sota & Aznar, Bilbao, Spain.

## To Confer on Simplified Packaging of Bolts and Nuts

WASHINGTON, Feb. 21.—The National Committee on Metals Utilization, Department of Commerce, on March 1, will issue invitations to a conference March 23 in Washington on simplification of packaging of bolts and nuts. The Bolt, Nut and Rivet Manufacturers' Association, through its committee on standard packing, has submitted proposals for reducing the number of sizes of containers now used in handling, packing and shipping bolts and nuts. The survey of the current practice was started in 1924.

It has been stated by Chairman Ralph Plumb, of the Standardization Committee which conducted the survey, that "these lists have been prepared after a careful study of orders received and are the result of six different methods of approaching this subject. While the quantities noted on these lists are, in a number of instances, a radical reduction from the general packing list now in use by the industry, the committee

is of the opinion that this reduction in quantity and weight per case will not increase packing cost, but, on the other hand, will decrease it, as it moves a large number of sizes from the mixed case list, and its expensive packing, to the straight case list and its lower costs."

It is estimated that 1,250,000 tons of steel is converted annually into bolts, nuts and rivets, and that under the program there will result economies for distributors and users, as well as producers.

Profitable profit sharing is the subject of an article in the February issue of the Executives Service Bulletin, published by the Metropolitan Life Insurance Co., New York. In it, J. S. Baker, president of the Baker Mfg. Co., Evansville, Wis., maker of windmills, pumps and small gasoline engines, and one of the first companies in the country to introduce profit sharing among its employees, tells of the plan finally adopted as most successful for his company.

## Proposed Rate Reductions from Troy Furnace as High as 96c Per Ton

WASHINGTON, Feb. 21.—Reductions as high as 96c. per gross ton will be made in rates on pig iron from the blast furnace of the Hudson Valley Coke & Products Corporation at Troy, N. Y., to destinations in New England if the Interstate Commerce Commission puts into effect the mileage scale proposed in the report of Examiner W. J. Harris, an abstract of which was published in THE IRON AGE of Feb. 17, page 543. At the hearing it was estimated that the normal consumption of pig iron in New England is 800,000 gross tons annually, of which 35 per cent or more is consumed in the southern portion.

At present the Troy furnace, located on the New York Central Railroad, is given commodity rates on pig iron to New England destinations. These rates are for two groups of destinations. To one the rate is \$3.66 and to the other it is \$3.78. Joint-line hauls for distances ranging from 100 to about 225 miles are required. In several instances, as explained by the examiner, the distance to a point taking the \$3.78 rate is less than to another point taking the \$3.66 rate. The rates were assailed as being unreasonable and unduly prejudicial to the Troy furnace and preferential to competitors in Rhode Island, Massachusetts, Pennsylvania and Maryland.

The outstanding complaint of the Troy furnace, blown in in March of last year, is that the rates are unreasonable compared with those from the new furnace of the Mystic Iron Works at Everett, Mass. For the six-month period ended Sept. 30, 1926, according to the examiner's report, only 8077 gross tons of pig iron were shipped from Troy under the present rates. Shipments of pig iron from Everett and Boston, Mass., and Providence, R. I., to local points on the New Haven railroad move on a scale set up by that carrier, while on shipments imported through Boston to destinations on the Boston & Maine, and the New Haven, loading charges as high as 60c. per ton, in some instances, are absorbed by these carriers. On shipments from Everett to New Haven points the New Haven absorbs one-half of the switching charge, amounting to approximately 12.5c. per ton. The New Haven scale is considerably higher than the scale formerly in effect on the Boston & Maine. In 1926 the latter railroad established specific commodity rates on pig iron in place of its mileage scale, but such rates are practically the same as those previously applicable under the mileage scale. Broadly, the proposed scale from Troy would have the effect of giving that point the same rates on pig iron as those applying from Everett for like distances so that at the midway point between the two sources of production the rates would be the same. The proposed mileage scale, it is said, would also aid the Troy furnace in meeting foreign competition. To many points the rates from Troy would be lower than the rates from Everett, as contrasted with a reverse situation under the present rate structure. For example, the present rate from Troy to Bristol, Conn., is \$3.66, while under the proposed mileage scale it would be reduced 96c. to \$2.70 a gross

ton, or 50c. a ton under the rate of \$3.20 from Everett to Bristol. The mileage scale proposed for Troy provides a rate of \$2.50 per gross ton for 105 miles and under up to \$3.65 per ton for 216 miles and over.

## Simplification of Pipe, Valves and Fittings

Under the elimination of waste program of the Department of Commerce, Simplification Recommendation No. 57 has just been issued by the Bureau of Standards, covering wrought iron and wrought steel pipe, valves and fittings. Copies of the pamphlet of 16 pages may be obtained at 5c. each of the Superintendent of Documents, Government Printing Office, Washington. Four pages are taken up by a list of associations, producers and other interests which have accepted this recommendation and approve of the general purpose and program of waste elimination. Tables are given of the main dimensions of both standard weight and extra strong pipe. Outside diameter is the same in each case for corresponding nominal inside diameter. The extra strong, with its considerably greater wall thickness, has a consistently smaller actual inside diameter than the standard weight pipe.

## Engineering Foundation Elects Officers

Lewis Buckley Stillwell was reelected chairman of the Engineering Foundation, research agency of the national societies of civil, mining, mechanical, and electrical engineers, at the annual meeting of the foundation held in the Engineering Societies Building, 29 West Thirty-ninth Street, on Feb. 17.

Mr. Stillwell, a consulting engineer, New York, is past-president of the American Institute of Electrical Engineers and the American Institute of Consulting Engineers.

Arthur D. Little, founder and president of the Arthur D. Little Laboratories, Cambridge, Mass., was elected a vice-chairman. George A. Orrok, consulting engineer, New York, was reelected a vice-chairman. J. Vipond Davies, representing the American Institute of Electrical Engineers and the American Society of Civil Engineers, and Dean Arthur M. Greene, Jr., of the Princeton School of Engineering, were named again as members of the executive committee. Other officers elected were: Director and secretary, Alfred D. Flinn; treasurer, Jacob S. Langthorn; assistant treasurer, Harry A. Lardner. Alva C. Dinkey, Midvale Co., Philadelphia, is a new member of the board.

The gathering marked the close of the eleventh year of the Foundation, which was established through a gift of \$500,000 by Ambrose Swasey, Cleveland, and later increased by other benefactions, including \$50,000 under the will of the late Henry R. Towne.

Some further increases in daily rates of motor car production have been made recently, says *Automotive Industries*, although the industry as a whole is still slightly under the level of the same period a year ago.

### Rates on Pig Iron from Everett, Mass., and Troy, N. Y.

(Per Gross Ton)

From—	*Everett, Mass.		Troy, N. Y.	
	Proposed Rates	Present Rates	Proposed Rates	Present Rates
To—				
Bristol, Conn.	\$3.20	\$2.70	\$3.66	
Hartford, Conn.	2.52	2.70	3.66	
Ansonia, Conn.	3.20	2.90	3.78	
New London, Conn.	3.20	3.30	3.66	
Taunton, Conn.	2.00	3.60	3.66	

\*On shipments from Everett to New York, New Haven and Hartford destinations this railroad absorbs one-half of the switching charge, which amounts to approximately 12.5c. per ton.

### Proposed Scale for Pig Iron Rates from Troy, N. Y., to New England Points

Distance	Rates per Gross Ton
105 miles and under*	\$2.50
106 miles and not over 115 miles	2.60
116 miles and not over 125 miles	2.70
126 miles and not over 135 miles	2.80
136 miles and not over 145 miles	2.90
146 miles and not over 155 miles	3.00
156 miles and not over 165 miles	3.10
166 miles and not over 175 miles	3.20
176 miles and not over 185 miles	3.30
186 miles and not over 195 miles	3.40
196 miles and not over 205 miles	3.50
206 miles and not over 215 miles	3.60
216 miles and over	3.65

\*No hauls shown for distances less than 100 miles.

# Research in Foundry Iron Needed\*

Some Problems Which Must Be Solved—Analyses Do Not  
Tell the Whole Story—Trend Toward  
a Carbon Specification

BY DR. RICHARD MOLDENKE

So far as the quality of the product is concerned, the history of the production of pig iron for foundry purposes is one of constant retrogression. The steps in this deterioration began with cold-blast charcoal pig iron, then anthracite iron, coke iron; then gradually warm to hot-blast coke iron, with the charcoal furnaces also heating their blast to get greater tonnages, and finally the present day hot-blast coke irons with scrap additions to the ordinary burden that, according to one European report, have gone as high as 65 per cent.

## *Economic Pressure The Key*

Parallel with this quality retrogression is the enormous increase in furnace tonnages from about 15 tons daily to over 1000 tons per day in exceptional instances of modern practice. The key to this situation is economic pressure. The effect is a growing differentiation between furnace production for gray iron and malleable foundries and for the production of commercial steel. As the foundry is often compelled to draw upon the pig irons made for steel purposes, for economic reasons, whereas the steel industry does not draw upon foundry pig irons proper, the situation is resolving itself into one of grave consequence for the life of the gray-iron castings industry, and hence the intensive present-day feeling in foundry circles for rigid specifications to govern the quality of pig irons sold for foundry use.

In the discussion of a paper on the use of scrap in the blast furnace held recently by the institute, a pertinent remark was made by one of the participating furnacemen, who confessed that "the things found wrong by the foundryman with his iron were beyond his depth." It may be added that those things are also beyond the depth of most foundrymen who, however, know from their results that they are getting poorer castings today with many pig irons than they did with those same brands in former years. Under the former fracture buying, the foundryman at least could select the strongest metal, as judged by the sledge, from various brands of similar fracture and pig section, and his results proved the soundness of his conclusions. With the advent of iron analysis, and in spite of the growing uniformity of the metal through greater tonnage production, furnace attention was diverted from quality production to obtaining greater yields of iron within a given analysis range.

## *Conditions Under Which Pig Iron is Melted*

How the foundryman had to meet this situation, apart from setting his own house in order on the score of production practices, is best illustrated by the action of one prominent foundryman who took the entire output of two Southern cold-blast charcoal furnaces as long as they ran. He did this, no matter what their analyses were. By admixing a small percentage of this very high-class pig iron, which did not in the least affect the analyses of the rolls he made, he obtained for his product a much longer wear in service than others obtained who did not so improve their mixtures. The reason for this situation is what foundries and furnaces would like to know, and is the best argument for a concerted drive for research on the part of both industries working together to a common end.

Perhaps an analysis of the operating conditions

\*Paper substantially in full presented at the round table discussion on carbon in pig iron, at the annual February meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 16. The author is consulting metallurgist, Watchung, N. J.

under which pig irons are remelted will give a clearer insight into the problem. The processes carried out in the blast furnace are supposed to be of a strictly reducing character. Ores are deprived of their oxygen to yield metallic iron and what manganese may be present. Similarly silica from fuel ash and ore gangue yields silicon in proportion to the temperatures existing, while carbon is taken up from the fuel by the melting iron sponge. Sulphur and phosphorus are accompanying unavoidable ingredients. If reduction has been complete, there should be no evidences of residual oxides, or even a reoxidation at the tuyeres. This is in contradistinction to the effect of all remelting processes, which are more or less oxidizing and, as used in foundries in the production of castings, yield a product that exhibits somewhat different physical characteristics than metal poured into molds "direct" from the blast furnace, even with the same composition in both instances.

This has led to the term "virgin metal" given to pig iron from the blast furnace, where as the remelted pig iron going into castings, sprues, etc., and finally ending in the scrap pile is called "remelted stock." The proportioning of pig to scrap in foundry mixtures is one of the important elements in the production of castings with desired qualities, the same analysis with higher pig percentages giving softer castings as a general rule. The use of scrap to excess in the furnace, delivers metal having some of the characteristics of remelted stock to the foundry, and hence upsets the calculations of the foundryman in his own work.

## *Deoxidation Not Possible in Foundries*

When pig iron is used for steel making, whether by the Bessemer, open-hearth or electric furnace process, a deliberate oxidation of the metal is effected to remove the carbon, etc. This leaves the metal so badly oxidized, however, that it must be deoxidized with silicon or manganese, and thus wind up with a reducing process. This is possible because of the high temperatures prevailing that are not attained in the ordinary foundry melting processes. It may, therefore, not be essential for furnaces supplying the steel industry to aim for the high quality necessary for foundry purposes. But for the gray iron and malleable foundries, in which the molten metal cannot be given a deoxidizing finish with any degree of certainty, the pig irons used must not have been subjected to any oxidizing influences in the making at the furnaces, for they get enough oxidation in the foundry melting operation later on. Although it should be the business of the foundryman to conduct his melting operation so that the very smallest degree of oxidation takes place, for melting is all that he wants, it will be readily understood that the better the material he starts with, his own operations being normal and under the best conditions possible, the better will be his product.

Until the time comes, therefore, when it is possible successfully to deoxidize molten foundry iron, pig irons must be able to stand enough of the unavoidable oxidation incident to normal foundry practice, to allow the making of satisfactory castings, if the foundry is to live. That many of the foundry pig irons of today will not fill this requirement is patent, and inquiry need only be made of manufacturing concerns processing the castings they purchase or make, to learn that without change in practice, results have become more irregular than ever before and can only be corrected by cutting out offending pig irons. Where castings do not enter into conditions of actual service

this may not be so apparent, and may account for good reports received by furnaces on their high-scrap pig irons. But the acid test of machining the castings and putting them to work quickly brings out the facts.

#### *Analyses Do Not Tell the Whole Story*

The ordinary analysis of cast iron does not tell the whole story by any means. The foundryman has no way of telling whether the furnace from which he may get some of his iron is running normal or working badly. The analysis will not tell him this unless it is complete enough and the separate determinations have been carried through accurately. Thus, high sulphur and low total carbon will ordinarily show up an "off" iron. Furnaces, however, avoid carbon determinations if possible, and with the volumetric sulphur method, and the possible presence of such elements as copper, which influence this method seriously, the foundryman usually finds himself in trouble without having known beforehand that this or that pig iron could bear watching closely.

The time may come when a reported analysis will include oxygen of dissolved iron oxide and of occluded gases separately; nitrogen; possibly hydrogen, surely chromium, copper, nickel and many other elements present in small but appreciable quantities. The information gained from the study of catalytic action by small percentages of foreign material in a substance will eventually throw light upon the mystery of "iron without life" in the foundry. Why is it that oxidized iron freezes so quickly in spite of a high degree of superheat that may be available? There is much yet to learn on the question of a real analysis of pig and cast iron, and better knowledge on the subject will enable furnace and foundry to search for ways of avoiding troubles, or where it is not possible to do this, to correct them.

#### *Trend Today Toward a Carbon Specification*

The trend today is toward a specification of the total carbon content in pig irons. Formerly this was the exception and fixed only when it was essential that the irons be of the highest character for very special purposes. It is well known that the normal total carbon content of any pig iron depends on the silicon content, the temperature and operation of the furnace, in lesser measure the content of the other elements, and doubtless other matters of furnace practice better known to the furnace operator. Would it not be wise, then, for the furnaces to study this question and settle, together with the foundrymen, a minimum for

total carbon for given silicon ranges, so that there may be no eventual necessity of combating freak specifications of this rather difficultly controlled element later?

There remains a final consideration. Foundrymen should be willing to pay for well-made pig irons. As a matter of fact, it will be found that wherever it is essential that the so-called "honest" pig irons, that is, pig irons made with more than enough coke, be used, there will be found a willingness to pay a reasonable premium for them. That this is the case may be seen from the continued production of charcoal pig irons, of the extending use of the special nickel-chrome (Mayar) pig irons. All these irons sell above the market price of the regular run of foundry pig irons. Indeed it is to be hoped that furnaces will cater specially to discriminating foundrymen, and give them lines of pig iron specially suited to their requirements, such as irons for making piston rings, Diesel engine cylinders and heads, or high-test cast iron for various purposes.

#### *Machine Casting Must Expand*

The recent developments in Germany in superior quality castings, particularly if the results obtained there can be duplicated with our pig irons, will call for extra quality in the pig irons and, strangely, that they be not only machine cast but that they be chilled by water in addition. This may seem iconoclastic to the old-time foundryman, but looks very much as if the machine casting of pig iron has not yet gone far enough.

Should the proposal to have furnaces and foundries cooperate in a joint study of the testing of and specification for foundry pig iron be taken up seriously, much good will result to these branches of the great iron industry. Although the foundrymen have their excellent organization and can readily undertake lines of tests cooperatively, study of furnace operation seems to have been confined to individual investigators connected with industrial entities not closely related. Much has been published here and abroad, but it would seem to have been overlooked or disregarded, such as investigations by very capable talent on the re-oxidation of iron in the blast furnace as it passes the tuyere region. And yet this may have a vital bearing on the desired quality of foundry pig irons. It would, therefore, seem time for the technical side of the furnace development of the country to be organized into associated effort, so that this industry may benefit in similar manner as has that of the foundry. With these two interests doing effective research work, cooperation will inevitably result.

## ORNAMENTAL IRON WORK

### Fabricated Structural and Other Forms Amounted in 1925 to Over \$420,000,000

WASHINGTON, Feb. 19.—Production of fabricated iron and steel structural and ornamental work in 1925, according to preliminary figures of the Bureau of Census, was valued at \$420,997,579, an increase of 3.7 per cent as compared with \$406,117,279 for 1923, the last preceding census year.

Establishments classified in this industry are those engaged in the manufacture of fabricated steel products for building and bridge construction, fire escapes, bank fixtures, elevator inclosures, metal lath, portable steel buildings, reinforcing steel for concrete work, metal windows and sash, and similar structural steel and ornamental iron products. This industry does not include the production, by rolling mills, of structural steel not fabricated.

In addition, structural and ornamental iron products are manufactured to some extent as secondary products by establishments engaged primarily in other industries. The value of such production outside the industry proper in 1923 was \$23,624,883, an amount equal to 5.8 per cent of the total value of products reported for the industry as classified. The correspond-

ing value for 1925 has not yet been calculated but will be shown in the final report of the present census.

Of the 1136 establishments reporting for the latest census, 222 were located in New York, 118 in Illinois, 115 in Pennsylvania, 112 in California, 95 in Ohio, 68 in New Jersey, 64 in Massachusetts, 38 in Michigan, 38 in Missouri, 24 in Indiana, 20 in Wisconsin, 19 in Connecticut, and 203 in 30 other states and the District of Columbia. The statistics for 1925 and 1923 are summarized in the table.

	Fabricated Iron and Steel Work		
	1925	1923	Per Cent of Increase or Decrease (—)
Number of establishments .....	1,136	1,056	7.6
Wage earners (average number)....	48,341	51,591	— 6.3
Maximum month....	Oct. 51,066	Aug. 54,480	...
Minimum month....	Jan. 44,204	Jan. 47,319	...
Per cent of maximum .....	86.6	86.9	...
Wages .....	\$77,411,499	\$80,832,875	— 4.2
Cost of materials (including fuel, electric power and mill supplies)....	237,652,611	225,487,217	5.4
Value of products....	420,997,579	406,117,279	3.7
Value added by manufacture .....	183,344,968	180,630,062	1.5
Horsepower .....	211,732	205,518	3.0

## U. S. Refractories Acquires Savage Mountain Fire Brick Co.

The United States Refractories Corporation, Mount Union, Pa., has acquired the Savage Mountain Fire Brick Co., Frostburg, Md., through purchase of all of the outstanding stock of the latter. With this additional plant, the United States company will have an annual capacity of 20,000,000 9-in. equivalent fire clay brick. It has an annual productive capacity of 50,000,000 9-in. equivalent silica brick.

The Savage Mountain company was organized in 1864 by the late Loveland M. Gorsuch and has a brick plant on Bowery Street, Frostburg, and controls a large deposit of fire clay on Savage Mountain, a short distance from the plant.

The new management proposes for the present to maintain the company as a subsidiary instead of an integral part of the United States Refractories Corporation. Thomas N. Kurtz, Pittsburgh, president of the purchasing company; C. V. Hackman, Mount Union, Pa., vice-president; Victor L. Wallett, Mount Union, Pa., secretary-treasurer, together with Gurney A. Shuckhart, Frostburg, general superintendent Savage Mountain company and P. N. Risser, Bedford, Pa., will comprise the board of directors of the subsidiary.

The Pittsburgh sales office of the Savage Mountain Fire Brick Co. will be transferred from the Federal Reserve Building to 641 Oliver Building. Ralph E. MacDonald, sales manager of the company, will continue in charge of sales and will also handle the products of the United States Refractories Corporation, along with Vance M. Norton.

## Jones & Laughlin to Use Car Ferries Between Plants

To handle interplant movements of steel the Jones & Laughlin Steel Corporation will soon begin construction of the first railroad car ferry in the Pittsburgh district. Details have been completed for construction of two steel barges, which are to be used between the Pittsburgh and Woodlawn, Pa., plants, one barge to be at the disposal of each terminal. The barges will be 200 ft. long, 35 ft. wide and have capacity of eight railroad cars of 100 tons each. Considerable expense is now entailed in the movement of cars between the two plants and, besides a saving in that direction, it is expected that delays in loading and unloading and the congestion in the railroad yards will be reduced.

## Structural Steel Board of Trade Will Do Estimating

The Structural Steel Board of Trade of New York, an organization of structural steel fabricators in the metropolitan district, will on March 1 have its own engineering department, headed by Franklin H. Branin. The purpose of the plan is to correct the errors which sometimes creep in when several contractors are bidding separately. Fabricators will, as usual, furnish their own prices, the service of the board being confined to the estimating of quantities only.

## Robert C. Lea & Co. Relinquish Sale of Robesonia Pig Iron

Robert C. Lea & Co., Stephen Girard Building, Philadelphia, who have had the selling agency for Robesonia pig iron for about 25 years, will relinquish that account shortly, when ownership of the Robesonia Iron Co. will pass into other hands. The firm will continue to sell pig iron on a brokerage basis for other furnaces and will also handle coke, limestone and allied products. It is one of the oldest in the merchant pig iron business, having for several decades been prominent in the Eastern pig iron markets. It was first known as J. Tatnall Lea & Co. In 1903 Robert C. Lea withdrew from that firm, taking the Robesonia agency with him. J. Tatnall Lea & Co. until a few weeks ago remained a going business, but confined itself to sales of coal.

## Jones & Laughlin Plants Make Unusual Safety Records

An unusual record in safety work was made by the various plants of the Jones & Laughlin Steel Corporation, Pittsburgh, during the observance of a no-accident month last November. As a result of the campaign in the mills and railroads of the corporation, there was a general reduction in severity of 78.6 per cent as compared with the record of November, 1925, and a reduction of 54.4 per cent compared with October, 1926. In frequency rates the decreases were 40.1 per cent and 39.6 per cent respectively. As a result of contests conducted between the Pittsburgh works and the Aliquippa works of the company and between the Monongahela Connecting Railroad and the Aliquippa & Southern Railroad, bronze trophies were awarded the Pittsburgh works and the Monongahela Connecting Railroad.

## Core Ovens for New Buick Plant

A notable core oven installation is now being erected at Flint, Mich., for the new Buick foundry. There will be nine overhead horizontal units, eight 145 ft. long and one 117 ft. long. Each oven inside will be 15 ft. 6 in. wide and 9 ft. 9 in. high.

The green cores from the core making machines will be loaded directly upon a continuous trolley conveyor, carrying racks of five shelves each 38 x 48 in. There will be 83 racks to each oven unit, and the conveyor will have a variable speed drive to govern the baking period. All oven units will be oil heated. In the design adopted economy of floor space and high operating efficiency are stressed. Except for the conveyor units, the installation is being designed and manufactured by Young Brothers Co.

## Court Decision Opposes Sympathetic Strikes and Secondary Boycotts

A decision affecting the fabricators of sheet steel was recently handed down in the district court of the United States for the Western District of Pennsylvania in the case of the Columbus Heating & Ventilating Co. vs. the Pittsburgh Building Trades Council. The heating and ventilating company, engaged in the making and installing of equipment in public buildings of the Middle West, operates its factory at Columbus, Ohio, as an open shop, while the installing forces employed in various cities where work is being done by the company are usually members of the Sheet Metal Workers' Union.

Following the failure of a recent attempt by the Sheet Metal Workers International to unionize the Columbus factory, the former organization decided to concentrate upon the Columbus plant, and members of the Sheet Metal Workers' Dayton, Ohio, and Pittsburgh locals were called from work being done in those cities by the heating and ventilating company. In granting the injunction restraining the members of the union from maintaining a strike against the Columbus company Judge Thompson of the United States District Court established the fact that, where there is no controversy between the employer and the employee, the labor unions cannot, without violating the law, call sympathetic strikes, institute secondary boycotts or interfere with the operations of any employer.

## British Institute Not to Visit Montreal

The proposed meeting of the Iron and Steel Institute (Great Britain) at Montreal at the time of the Empire Mining and Metallurgical Congress in the late summer will not take place. The institute has decided that the leading men of the industry are likely to be too busy reorganizing the industry after the complete stoppage of last year, so that it would be difficult for them to absent themselves for the five or six weeks which attendance at the meeting in Montreal would require. The fall meeting of the institute will accordingly take place at some center in Great Britain.

## IMPORTS OF ANVILS

### Foreign Shipments Have Driven Out of Business All But Three American Producers

**A**N interesting phase of the import movement, and one which is disturbing to the three remaining domestic manufacturers concerned, relates to incoming shipments of anvils. While imports of this item, like domestic production itself, are small because of the limited market and the enduring qualities of the product, foreign price competition is said to have driven all except three domestic producers out of business. The three remaining producers are the Columbus Anvil & Forging Co., and the Columbus Forging & Iron Co., Columbus, Ohio, and Fisher & Norris, Trenton, N. J.

Imports of anvils have shown a relatively large increase. In 1924 imports amounted to 169 tons, with an invoice value of 8.7c. per lb.; in 1925 a total of 218 tons, with an invoice value of 8.3c. per lb.; and in 1926 an increase to 358 tons, with a value of 8.65c. per lb.

#### Sweden the Main Source

Most of the imports came from Sweden. In 1924 imports from that country amounted to 132 tons, in 1925 they were 163 tons and in 1926 they were 288 tons—77.8, 74.7 and 80.8 per cent respectively of the total. Next to Sweden as the principal source of these imports came the United Kingdom, which supplied 36 tons in 1924, 54 tons in 1925 and 45 tons in 1926. Imports from Germany were less than one ton in 1924 and 1925, but in 1926 they were 21 tons. New York and Philadelphia have been the principal ports of entry, though St. Louis, with 60 tons from Sweden in 1926, took second place, that year, from Philadelphia.

## Fewer Coke-Oven Accidents

Accidents at coke ovens in 1925 were fewer, in relation to number of persons employed, than for any preceding year for which figures are available. The death rate, according to a statement of the United States Bureau of Mines, was 1.16 for each thousand 300-day workers. This was the same as the rate in 1924, but lower than in any preceding year. The non-fatal injury rates, based upon all lost-time accidents, were 70.51 in 1925, compared with 79.54 in 1924. Each in turn was the lowest such rate ever recorded, the previous low having been 90.78, in 1915.

Employees on which these figures were based numbered 23,254 in 1925. This was an increase of 28.03 from 1924. Pennsylvania led with 7297 men; Ohio had 2200; Indiana, 2146; Illinois, 2025; Alabama, 1764; West Virginia, 1279; New York, 1115; Michigan, 1040. These eight States employed 81 per cent of the total. Their combined accident rates were lower than the average, having been 1.04 for fatalities and 65 for non-fatal injuries.

## Recovery in January Automobile Production

January production of automobiles in the United States is reported by the Department of Commerce at 196,973 passenger cars and 37,157 trucks. The total represents 234,130 vehicles. This is a sharp gain under both headings from the December production of 137,361 cars and 28,461 trucks, or a total of 165,822 vehicles. It represents, however, the lowest January output since 1922, when, in a year of much smaller production than has been known more recently, the output was 81,696 cars and 9596 trucks. Except for last December, production of passenger cars in January was the lowest for any month since December, 1924. With that sole exception, it was the lowest for any month since September, 1922.

Revised figures of the department for some of the months in 1926 place the total production for the year in the United States at 8,765,059 passenger cars and 494,568 trucks, both being new high records. The total

number of vehicles was 4,259,627. Canadian production of 1926, as reported by the Dominion Bureau of Statistics, was 164,487 passenger cars and 40,629 trucks, an aggregate of 205,116 vehicles. Adding these figures to the United States production, the passenger car total becomes 3,929,546 and the truck total, 535,197, an aggregate of 4,464,743 vehicles.

## Sales of Mechanical Stokers

Mechanical stokers sold in January are reported by the Department of Commerce at 69, of a total of 40,467 hp. This is a gain from both December and November, the December figure having been 34,974 hp. It is higher than in January of either 1926 or 1925. It is lower, however, than the 45,519 hp. in the average month of 1926, or the 46,111 hp. in the average month of 1925.

One establishment discontinued making mechanical stokers, between the December report and that for January, leaving 11 establishments active. A similar discontinuance, nearly a year ago, reduced the number from 13 in February to 12 in March.

## Wholesale Prices Still Lower

Further reduction in the average of 404 wholesale commodities, reported by the United States Bureau of Labor Statistics, occurred in January. The index stands at 146.9, based on the 1913 average of 100, a fractional drop from the 147.2 of December. In January, 1926, the figure was 156. The current level is the lowest since June, 1924; with that sole exception, it is the lowest since April, 1922.

Farm products recorded the only substantial increase among the great groups covered. A fractional increase was made by the miscellaneous group, based principally upon a heavy increase in cattle feed. This places the farmer in a better position than for some time past, for all other items showed decreases ranging from 1.3 points in the metal group to 6.1 points under chemicals and drugs. The chemicals, at 122.1, have dropped below the metals (124.4). This is the first time in many months that the metals have not held lowest position of the eight specific great groups. The movement toward the average was continued in January, for six of the eight groups moved nearer to the average than they were before. Only two moved away from the average, these being the chemicals and the metals—the two lowest items of all, both of which decreased still further.

## Pittsburgh District River Traffic Declines in January

The United States Engineer's office, Pittsburgh, reports that commerce on the Allegheny, Monongahela and Ohio rivers in January totaled 2,646,617 net tons, as compared with 2,946,643 tons in December. Coal furnished approximately 85 per cent of the tonnage moved in January. The figures in net tons are as follows:

Commodity	Allegheny	Monon- gahela	Ohio	Total
Coal	46,700	1,728,132	478,110	2,252,942
Coke	15,900	78,236	28,700	122,836
Gravel	12,725	46,850	38,300	97,875
Packet cargo			3,277	3,277
Sand	12,850	41,850	42,750	97,450
Iron and steel		27,900	26,409	54,309
Unclassified	1,067	12,911	3,350	17,928
Total	89,242	1,935,879	621,496	2,646,617

Industrial accidents in the United States in 1925 are reported by the Bureau of Labor Statistics to have numbered 1,698,494, of which 10,537 resulted in death. These figures compared with the 1924 total of 1,678,001, of which 11,479 were fatal, and with the 1920 total of 1,647,899, of which 11,062 were fatal. Handling of tools and other objects gave rise to more than 30 per cent of the accidents. Machinery came next, with about 20 per cent of the total.

## MULTIPLE-SPINDLE DRILLS

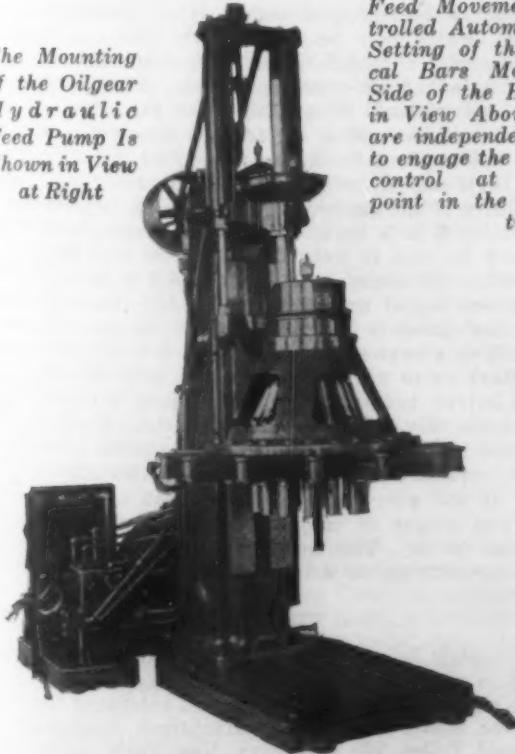
### Automatic Hydraulic Feed Control Features Machines for Drilling Structural Shapes

THE Harrington Co., Seventeenth and Callowhill Streets, Philadelphia, has recently completed two hydraulic feed multiple-spindle drilling machines—one vertical and the other horizontal—designed for use in drilling heavy structural beam and column sections.

The vertical unit, illustrated herewith, will be employed for drilling the web and the horizontal machine, with opposed heads, will be used for the simultaneous drilling of both flanges of beams and columns up to 30 in. in depth. Several of the machines will be installed in one department, and the work will be passed from one machine to the other over spacing tables. The following description is of the vertical machine, which, except for the hydraulic feed, is similar to the company's standard No. 63-B multiple-spindle drill. A description of the horizontal unit will be given in a later issue.

Features of the machine include the hydraulic feed, the arrangement of feed control and the construction of the multiple-spindle drill head, in which are incorporated patented "screw lock" spindle units and "oil-well" universal joints. The drilling head carries 12 No. 9 spindles and the actual area of spindle centers is a circle  $2\frac{3}{4}$  in. in diameter. The oil-well universal joints are  $\frac{1}{2}$  in. in diameter and are rated as capable of driving 1  $5/16$ -in. drills in mild steel. The shortest distance between spindles is  $2\frac{1}{4}$  in. Some of the work done on the machine requires smaller spindle centers and therefore an additional set of

*The Mounting  
of the Oilgear  
Hydraulic  
Feed Pump Is  
Shown in View  
at Right*



*Feed Movements Are Controlled Automatically by the Setting of the Three Vertical Bars Mounted on the Side of the Head as Shown in View Above. These bars are independently adjustable to engage the hydraulic valve control at predetermined point in the drilling operation*



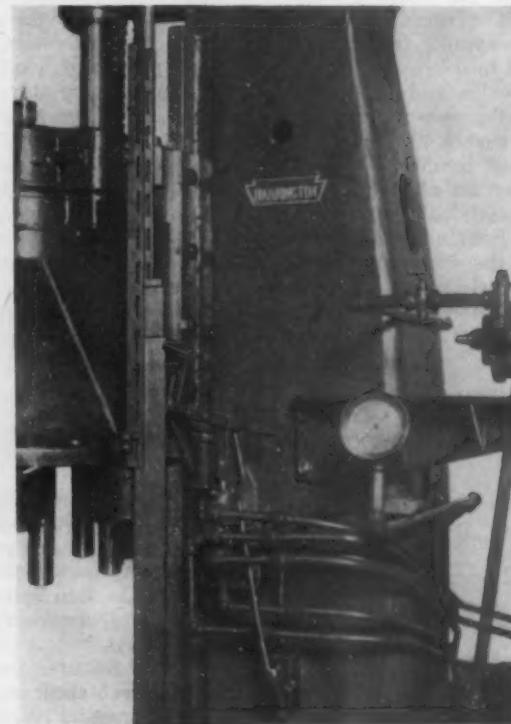
*Two Hydraulic  
Cylinders Are  
Employed,  
These Being  
Mounted on  
Top of the  
Machine*

spindles, of smaller diameter, is being furnished. Two motors will be employed on the machine, a 40-hp. motor for the main drive and a 5-hp. motor for the hydraulic pump. Push button control and dynamic breaking are provided.

The hydraulic feed is by means of an Oilgear QH pump mounted at the rear of the machine. In the piping from the pump, bent pipe is used in place of fittings wherever possible in order to increase the efficiency of the hydraulic transmission. It will be noted that two hydraulic cylinders are employed, these being mounted on top of the machine and directly in line with the guides on the column face, which arrangement is claimed to obviate binding of the head on the ways.

The feed control is automatic. Hand control by means of a valve control lever at the right-hand side of the machine is also provided, as well as foot control by means of a pedal connected to the valve control and extending to the front of the machine. The drill head is arranged to approach the work at a rapid rate, drill at coarse feed to a predetermined depth, then go into a comparatively fine feed just before the point of breaking through the work is reached, and finally to return at rapid rate.

These movements are controlled automatically by the setting of three vertical control bars carried in a bar of channel section mounted on the right-hand side of the head as shown in the accompanying close-up illustration. The flat bars move up and down with the head and are independently adjustable to engage the hydraulic valve control at predetermined points in the drilling operation. The adjustment is made simply by removing the screws from the tapped holes in the bars and channel section and inserting the screws in other tapped holes and slots in the same members.



A pressure gage, mounted adjacent to the operator's position at the side of the machine, is provided in the hydraulic feed system. This gage is intended to serve in warning of unusual conditions while drilling, such as harder than usual material, and especially in warning the operator when drills need regrinding, under all of which conditions abnormal pressure will be indicated.

The Oilgear pump consists of two elements, a constant delivery low pressure pump for rapid traverse and a variable delivery high pressure pump for feeds. The fast and slow feed rates are easily adjusted by means of two set screws on the pump. Feeds may be varied from 0 to 20 in. per minute. Rapid traverse is 120 in. per minute.

The drilling head is a solid casting and is of the company's standard design. It is counterbalanced, two chains being used. The spindle unit, of basic importance in multiple spindle drilling machines, is of the company's patented screw lock type, for which a number of advantages are claimed. The spindles are of forged high-carbon steel and each spindle is equipped with a thrust ball bearing inclosed in a brass sleeve to prevent the entrance of dirt and chips and retain the lubricant. The spindle sleeve is of bronze and is machined all over to close limits to assure proper alignment of the spindle under working conditions. It is made long enough to prevent deflection of the spindle shaft and the drilling load. A small ball bearing is used between the lower universal joint and the top to bronze spindle sleeve, which takes the wear due to the weight of the spindle parts. Radius bars are attached to the drilling head by bolts through holes in the flange of the head, beaded bars having side members of channel section being employed.

The patented screw-lock vertical adjustment fea-

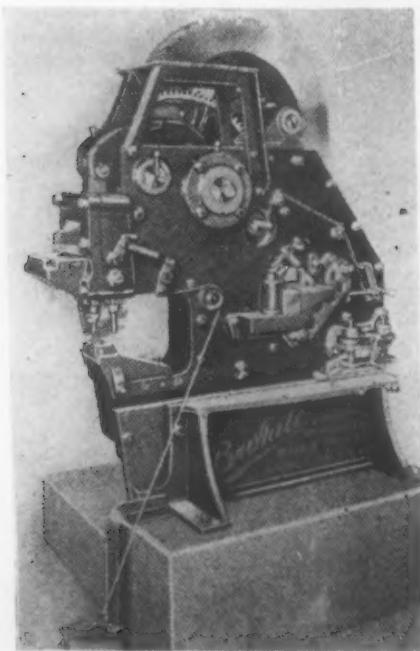
ture is a self-locking device intended to prevent the spindle from slipping after adjustment for drill length has been made. By means of this device the spindle can be adjusted for length of drills without moving the position of the radius bars. In this design a section of thread is hobbed in the spindle sleeve and a spindle adjusting screw is arranged to engage with this thread. This adjusting screw transmits the drilling thrust against the radius bar and it is held from moving endways by a collar. The lower end of the adjustment screw has a square hole for a special wrench, which turns the screw and moves the spindle sleeve up or down to obtain adjustment of the drill point for depth. This single adjusting screw controls the adjusting and locking.

Another feature of the spindle construction is the company's oil well universal joints, which are designed to provide thorough internal lubrication. These joints are made so that oil is thrown by centrifugal force, while running into each trunnion bearing. The joint will operate at a 30 deg. angle. It is made up of two fork members, four trunnion members, and a hollow rivet and washer with inwardly beveled edges. The fork ends and four trunnion members are heat-treated. The trunnion blocks are riveted to form one solid block and the oil hole through the center of the rivet delivers oil through two side outlets into the channel formed by the slot across the back of each trunnion. Each trunnion pin is drilled crossways and then a hole connects to the oil channel around the rivet.

The driving pinions, which are of alloy steel, heat treated, are pinned to the upper universal joints. The column of the machine is of box section and is provided with a wide face to support the head. The base is heavily cross-ribbed and reinforced under the column pad.

### Adds Smaller Unit to Line of Universal Iron Workers

The Buffalo Forge Co., Buffalo, is manufacturing a new universal iron worker, designated as the No. 0, which combines a punch, shear and bar cutter. Al-



*Small Universal Iron Worker Combining Punch, Shear and Bar Cutter. Operation is at rate of 35 strokes per min.*

though the same in general design as the company's No.  $\frac{1}{2}$  and  $1\frac{1}{2}$  universal iron workers, previously described in THE IRON AGE, it is of smaller size and in-

corporates such simplifications as the smaller capacity makes possible, the speed of operation being also increased to 35 strokes per min. The machine is intended for quantity production work on comparatively light stock used in fabrication of metal grille work, railings, fire escapes, window frames, steel furniture, and similar products.

Special features include the rolled-steel frame and crucible steel shear blades with four interchangeable cutting edges. Five-piece bar cutter knives are provided to facilitate sharpening and replacement, and knives can be furnished for special shapes. The machine can be equipped with a triple punching attachment, which may be conveniently inserted, and with notcher for angles, I-beams, tees, channels, zees, plates and flats and other rolled shapes. This notcher may be used without interfering with the regular punch, shear and bar cutter. A feature stressed is that tools are not required for adjusting any of the strippers.

Lightness in weight and compactness are general features of the machine. The punching capacity is  $\frac{1}{2} \times \frac{1}{2}$  in. or  $\frac{3}{4} \times \frac{3}{8}$  in. in channels or I-beams with flanges 3 to 8 in., and in webs ranging from 3 to 10 in. The machine will shear  $\frac{3}{8}$ -in. plate and  $4 \times \frac{1}{2}$ -in. flats and trim one leg of angles up to  $2\frac{1}{2}$  in. The capacity of the bar cutter is for rounds up to  $1\frac{1}{4}$  in.; squares up to  $1\frac{1}{4}$  in.; angles (square) up to  $3 \times 5/16$  in.; angles (miter) up to  $2 \times \frac{1}{4}$  in.; tees  $2\frac{1}{2} \times \frac{1}{4}$  in. With special knives, beams and channels up to 4 in., 6.5-lb., or channels only 5 in., 6.5 lb., can be cut. Equipped with special tools the machine will cope square I-beams 3 to 6 in.; square channels 3 to 5 in.; square angles  $3 \times 5/16$  in. It will also notch 90 deg. angles up to  $2 \times \frac{1}{4}$  in.

The height of stroke is  $\frac{3}{8}$  in. and the depth of throat 10 in. The weight with pulley drive is 2200 lb. and with motor drive 2300 lb.

Electric hoist orders in January decreased 18.6 per cent in number and 16.8 per cent in value from December, and shipments, 22.5 per cent, according to records of the Electric Hoist Manufacturers Association, E. Donald Tolles, 165 Broadway, New York, secretary.

## New Boom and Crowding Device Increases Capacity of Crane

A crawling tractor crane equipped with a new boom and crowding device, developed by the Industrial Works, Bay City, Mich., is shown in the accompanying illustration. The  $1\frac{1}{2}$ -yd. bucket shown on this equipment is larger than the bucket formerly used, which was of  $\frac{3}{4}$ -cu. yd. capacity.

The new crowding device permits of bringing the bucket up closer to the top of the boom. The crowd-



*The New Crowding Device Permits Bringing the Bucket Closer to the Top of the Boom*

ing drum, located on the side of the boom, is of larger size than before, and the increased size of this drum together with the long boom is claimed to provide an unusually powerful rope-operated crowding device. It is now possible to start digging with the bucket well between the treads of the machine, the 25-ft. boom and the  $1\frac{1}{2}$ -yd. bucket permitting of starting digging at a distance of 7 ft. below the crawler treads. With the long boom, 27 ft., and  $\frac{3}{4}$ -yd. bucket it is possible to dig at a depth of 10 ft. below the crawler and between the treads.

The maximum dumping height of the crane equipped with  $1\frac{1}{2}$ -yd. bucket shown is 20 ft., and the dumping radius at this height is 23 ft. Formerly the dumping radius was 16 ft., with a "dipper stick" 15 ft. 6 in. in length and the boom 25-ft. long. With the  $\frac{3}{4}$ -yd. dipper the maximum dumping height is 23 ft., an increase of  $3\frac{1}{2}$  ft.; the dumping radius is 24 ft. with a 27-ft. boom and with a dipper stick 15 ft. 6 in. long.

The company is also building its crawling tractor crane with the gears for propelling the crawler exposed. These gears are of the self-cleaning type, being designed so that when the pinion meshes with the gear any dirt that gathers between the teeth is forced out toward the edges and then dropped.

## Sues Importer of German Machine Tools

Suit for infringement of several United States patents and upon a trade mark has been brought on behalf of the Cincinnati Bickford Tool Co., through its counsel, Nathan & Bowman, New York, against Morey & Co., operating as an importer of radial drills manufactured in Germany. The complaint alleges that the foreign made machine is not only a close copy of the plaintiffs' drill, but also that the trade name "Bickford" is used.

## Welded Structural Steel Construction Features Arc Welding Machines

Extensive use of welded structural steel is a feature of the 300-amp. alternating-current power supply "Stable-Arc" welder of the Lincoln Electric Co., Cleveland, here illustrated.

In this design only two castings are employed, the total weight of these castings being approximately 15 lb. The motor and generator end rings, brackets and connecting ring are of structural angles, rolled to shape and welded together. The feet of the motor generator set are of drop forgings. The truck wheels are made of T-sections rolled on a special machine, the hub of the wheel being of steel tube. The control panel, usually built of slate or special non-metallic compounds, is made of sheet steel welded together and welded to the supports.

Other sizes and types of the company's machines are being changed to incorporate the welded steel construction, the underlying idea of which is said to be the better meeting of the severe conditions to which portable welding equipment is subjected. Failure in operation of a welding machine is, in many cases, a serious matter. It is claimed that the steel construction, due to the fact that it will bend rather than break, reduces the liability of failure for the reason that the bent parts may be straightened and the equipment put in operation without waiting for replace-



*The Welded Steel Construction Is Used to Better Meet the Severe Conditions to Which the Portable Machines Are Subjected*

ment castings. It is claimed that in several cases where the control panel of machines of the type illustrated has been crushed and the instruments and switches wrecked, the equipment was repaired by straightening the panel and switches and put into operation within an hour without the instruments.

## Polishing and Buffing

Nearly five years ago (March 23, 1922, page 777), THE IRON AGE described the method of polishing and buffing wheel design and application of Divine Brothers Co., Utica, N. Y. The arrangements as there outlined have been amplified in a splendidly printed catalog of 120 pages in two colors, just issued by that company. Special wheel contours are shown in great profusion in the pages of the catalog, just as many were shown in the article. These contours are made to fit a wide variety of surfaces, on all manner of constructions, and to produce a surface of high polish. The catalog goes into details of construction of wheels of various descriptions and nature of materials, suited to use on a variety of metals and other substances.

One feature of the catalog is the layout of a department for handling this sort of work. Various types of machines for flexible grinding, polishing and buffing are shown, while the engineering service of the company is explained in some detail.

### Cold Saw Tooth-Cutting and Burr-Grinding Machine

A duplex combination cold saw tooth-cutting or knurling and burr-grinding machine, for use in steel mills, structural and other shops, has been built by the J. L. Osgood Tool Co., Buffalo, N. Y.

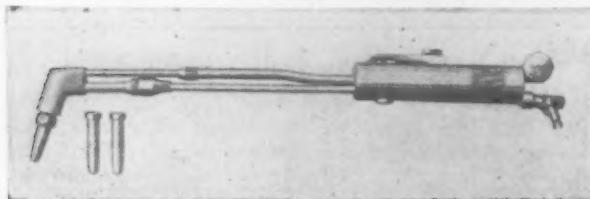
The capacity of the machine is for saws ranging in diameter from 20 to 90 in., and in thickness from  $\frac{1}{4}$  to  $\frac{5}{8}$  in. The machine is arranged so that two saws of unequal diameter and thickness can be cut and ground at the same time, each front and rear saw spindle and grinder heads operating independently of the other. High-speed steel cutters 6 in. in diameter, 6 in. face, spiral-quadruple cut, 8 pitch, running in oil, are employed. The saw carriage is adjustable horizontally so that the full width of the face of the cutter can be used before the cutter is worn out and needs recutting.

Rapid operation in the cutting of the saw teeth is claimed, the cutting being at the rate of 25 in. per min. on the saw periphery; eight teeth per inch,  $1/16$  in. deep; or any other pitch of tooth required according to the cutter used. It is stated that only two or three passes are required to finish the teeth. While the teeth are being cut the motor-driven emery wheels, one above and one below each saw, grind off the steel burrs raised during steel sawing process, or raised by the cutter in cutting the teeth. It is claimed that any ordinary mill hand can operate the machine. Various adjustments of the machine are made as indicated on the illustration, the carriage adjustment being at A, the grinder head adjustment at B, and the saw adjustment rods at C. Clamping bolts are shown at D, and the saw bushings at E.

The machine is regularly equipped with a 3-hp., 1200-r.p.m. constant-speed motor, which through geared reduction provides a spindle speed of 50-r.p.m. Belt drive can also be furnished. The floor space occupied is 11 ft. by 16 ft. when two 7-ft. saws are being cut. The height is  $5\frac{1}{2}$  ft. and the weight is 4500 lb. The machine is said to be adapted also for worm gear hobbing and similar work.

### Oxy-Illuminating Gas Cutting Torch

An oxy-illuminating gas cutting torch, designated as the type LPG, designed for use with city gas, natural gas or by-product coke oven gas under a pressure of 4 in. water, has been developed by the Alexander



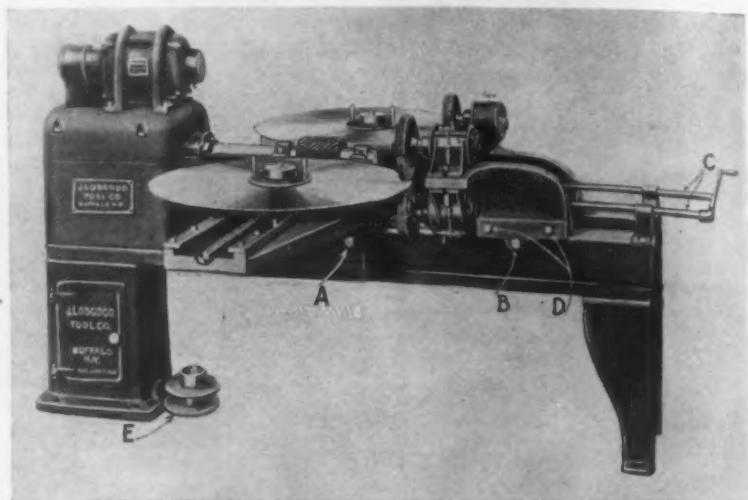
The Torch Uses City, Natural or By-Product Coke Oven Gas, the Latter as It Comes from the Ovens and at Line Pressure

Milburn Co., Baltimore. The torch is intended for cutting heavy plates, risers, billets, etc.

The by-product gas can be used unscrubbed, as it comes from the ovens. In a recent test with by-product gas of low B.t.u. content it is said that the cutting speed averaged 1 ft. per min. on 3-in. plate. Oxygen at 40 lb. pressure was used in conjunction with the gas, which was at ordinary line pressure. It is claimed that the cuts showed a sharp edge, without slag on

the underside of the cut, a narrow kerf and smooth surfaces. The surfaces of the metal were not case hardened by the cutting operation, this being stressed as facilitating subsequent machining of the pieces cut.

The torch, made up of bronze forgings and seamless tubing, is of rugged construction and evenly balanced. The cutting oxygen is controlled by a thumb valve which remains fixed in either open or closed position. The torch is supplied with a range of tips, to accommodate all thicknesses of metal. The tips are of solid



The Teeth of Cold Saws Ranging from 20 to 90 In. in Diameter Are Cut and Burrs Ground Off Automatically

copper, designed to rapidly pre-heat the gases, giving better penetration and quicker cutting.

### Machine for Rapid Lacing of Belts

The lacing of both ends of an 8-in. belt at the rate of  $1\frac{1}{2}$  min. is claimed for the belt lacing machine here illustrated which, designated at the No. 8, has been



Both Ends of an 8-In. Belt Can Be Laced in Less Than  $1\frac{1}{2}$  Min.

added recently to the line of the Clipper Belt Lacer Co., Grand Rapids, Mich.

Laboratory tests have revealed that the machine exerts pressure of 45,900 lb., which is said to be ample for embedding the hooks in alinement and flush with the surface of the belt, minimizing the wear on the hooks and pulleys and prolonging the life of the belt. The hooks are forced into the belt by a three-quarter turn of the crank of the machine.

The machine is intended for lacing belts ranging from 1 in. up to and including 8 in. in width in one operation. Belts from 8 to 16 in. wide can be laced in two operations, and belts up to 24 in. in three operations. The lacer employs sizes 2 to 6 clipper hooks. A stand can be furnished for the machine.

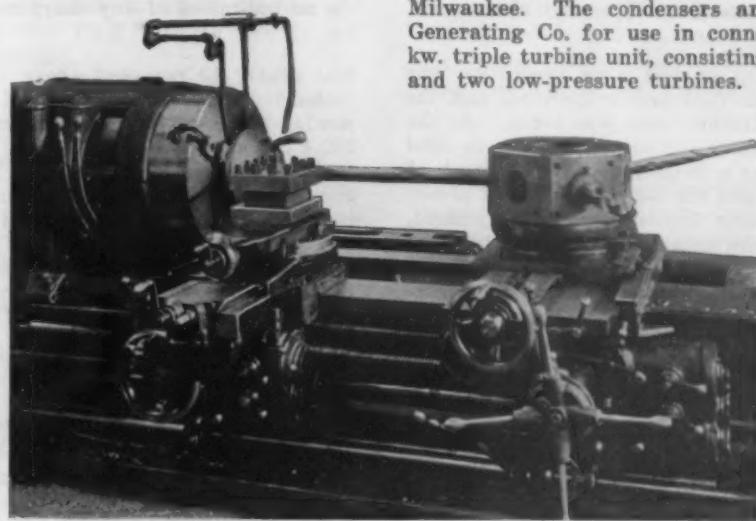
Mechanical loading, coal preparation, safety in coal production, and cutting and blasting in coal mines will be the principal topics for discussion at Cincinnati, May 16-20, when the American Mining Congress holds its annual convention of practical operating coal men and its national coal mining exposition.

### Compound Slide with Power Angular Feed for Gisholt Lathes

The Gisholt Machine Co., Madison, Wis., has brought out a compound slide with power angular feed for application to its Nos. 3L, 4L and 5L geared-head turret lathes. The device is stressed as of value to manufacturers having bevel gear or other steep taper work. It is not a single-purpose unit, however, inasmuch as it can also do the work done with the standard tool post.

This device is arranged to swivel through the full 360 deg., giving power feed to the tool in any horizontal direction. The upper slide has 6 in. of travel on the No. 3L, and 9 in. on the Nos. 4L and 5L turret lathes, and the square turret tool post can be used to turn or face diameters up to the full swing of the machine. The compound feed and cross feed, each having both power and hand feed, are operated independently of each other, and have graduated index dials. The power feed to the cross feed slide is disengaged auto-

*Compound Slide With Power Angular Feed, a New Feature on Gisholt Turret Lathes, Is for Bevel Gear and Steep Taper Work*



*The Device Is Arranged to Swivel Through the Full 360 Deg., Giving Power Feed to the Tool in Any Horizontal Direction*

matically when the power feed to the upper slide is engaged. The number and range of feeds are the same as the longitudinal feeds of the side carriage.

### New York Metal Merchants Hold Annual Dinner

The second annual dinner of the Metal Merchants' Credit Association of New York, composed of iron and steel warehouses, was held at the Waldorf-Astoria Hotel, Feb. 10. J. George Fuchs, executive secretary of the association presided. Following the dinner, formal addresses were omitted, being replaced by a program of special entertainment. Included among the guests were members of the sales departments of steel companies.

### Box and Crate Construction for Minimum Cost and Best Protection

A regular spring short course in box and crate construction, offered by the United States Forest Products Laboratory, Madison, Wis., will be given April 18 to 23, according to an announcement from the Federal Laboratory. The container courses are given twice yearly, for manufacturers and box makers interested in developing packages which will give adequate protection to merchandise with a minimum of lumber, shipping space and weight, and at a reasonable cost.

Principles underlying good container construction are presented to the classes by means of lectures, discussions and demonstration tests. For making the demonstrations a 14-ft. and a 7-ft. box testing drum, a sway-impact machine and a number of universal testing machines are used. Some of the tests are planned to show advantages and limitations of different styles

of nailed wooden boxes, of wirebound boxes, and of fiber boxes; importance of adequate nailing; effect of varying the number of pieces in sides, top, bottom and ends; advantages of hardwood ends and cleats; effect of using green lumber, and advantages of metal strapping; and tests of crates to show best types of construction for various loads.

In the case of shippers whose annual container bills are large, savings up to \$20,000 a year have been reported as a result of attendance in the box course. A cooperative fee of \$100 is required for each man enrolled. Applications should be addressed to the Director, Forest Products Laboratory, Madison, Wis.

### Eight Large Condensers to Serve One Turbine Generating Unit

An order for what is said to be the largest surface condenser equipment ever placed for one generating unit, has been received by the Allis-Chalmers Mfg. Co., Milwaukee. The condensers are for the State Line Generating Co. for use in connection with a 208,000-kw. triple turbine unit, consisting of one high-pressure and two low-pressure turbines. The two low-pressure

turbines are each double flow and two condensers are required for each set of low-pressure wheels, making four condensers for each low-pressure turbine or eight condensers in all.

Each condenser will contain 22,000 sq. ft. effective cooling surface, or 176,000 sq. ft. in all (4 acres). The eight condensers will be designed to handle 1,600,000 lb. of steam per hr. and will be supplied with 360,000 gal. per min. of circulating water from four vertical circulating pumps placed in a crib house outside the generating station. The condensers are of the vertical, single-pass type. Circulating water, entering through the lower water box, passes through the condenser tubes and then is discharged through overflow pipes contained in the condenser shell.

The condensate will be collected in hotwells and delivered against 250 lb. gage pressure by six three-stage condensate pumps, each rated at 1000 gal. per min. The air removal equipment will consist of two-stage steam jet air pumps, the first stages being attached to the condenser shell, and the second stages grouped with the surface inter and aftercoolers.

### Building Permits Decline in Cities

Building permits in January, in the 25 leading cities, are reported by S. W. Straus & Co. at \$168,234,000. This is a reduction of 24 per cent from the December total of \$220,626,000, and is lower by 2½ per cent than the total for January, 1926, which was \$172,850,000. New York showed the largest loss from a year ago, with Philadelphia, Detroit, Seattle, Miami, San Francisco, Cleveland and Boston following in that order, and each recording losses of more than \$1,000,000. Substantial gains were made by Newark, Chicago, Milwaukee, Akron, Ohio, Louisville, Flint, Mich., Yonkers, N. Y., Portland, Ore., and Los Angeles, each of which gained more than \$1,000,000.

# Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

## Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

STEEL production has rebounded from normal and is again well above estimated requirements.

Finished steel, after a long period of price stability, has turned definitely downward, in conformity with other prices.

Pig iron production, still heavily above nor-

mal, is due for an early and considerable curtailment.

It seems likely that a firmer pig iron market will develop before long, though it still is sagging.

Scrap is likely to decline further, but there is no indication of any sharp recession.

**I**N January the trend of steel ingot production was slightly upward, unfilled orders declined, and the average price of finished steel was lower. As the ingot output was so nearly normal, the decline in steel prices seems to indicate a reduction in the strength of the demand for steel, and the fact that unfilled orders declined strongly supports this conclusion. At present, a buyer's market clearly obtains in the steel business and seems likely to continue for several months.

THE IRON AGE composite price of finished steel averaged 2.425c. per lb. in January, which was only 95.8 per cent of the 1921 average. It compares with 2.453c. in December and 2.448 in January, 1926. At the middle of February, the composite price was 2.374c. Thus, after a long period of practical stability, the price structure has definitely sagged and the fact is emphasized by the lower level of semi-finished steel prices.

### Small Backlogs of Steel Orders

**S**TABILITY of such items as wire, bars and billets during the past year has been the more noteworthy because of the low level of unfilled orders. Probably in 1926 hand-to-mouth buying was more prevalent than ever before. Obviously, the backlog of the Steel Corporation is lower at the beginning of 1927 than it has been at any similar time in many years. With so small a volume of forward orders on the books of the steel makers, production and earnings should for some time reflect current conditions very closely.

The decline in unfilled orders in January was the more significant because in past years there has usually been a gain in that month.

Production of steel ingots increased a little more than usual in the first month of the year. On the average, January output runs about 7 per cent higher than that in December. This year, however, the figure

was nearly 10 per cent above December and our adjusted index shows a net gain of 3.4 per cent. In other words, ingot output in January is estimated to be 103.4 per cent of normal.

It is noteworthy that, in the last two months, production has been the closest to our estimate of normal requirements since the middle of 1925.

### Blast Furnace Output Still Unduly Great

**P**IG iron production continues relatively large in comparison with the output of steel. In January our adjusted index registered 112.2 per cent of normal, against 109.1 per cent in December. A year ago, however, the index was 121.2 per cent, and, except for December, the January figure was the lowest since November, 1925.

According to our estimate, pig iron production during the last six years has been above "normal" (by normal meaning the long-time trend) during 43 months, and below normal during 29 months. The question may well be asked: How could this preponderance of above-normal months exist? The answer is fairly obvious. In the first place, the foreign trade situation has been such that exports of iron and steel products have been well sustained. More important still, the extraordinary and abnormal activity in the building and automobile industries in this country have called for an above-normal output of iron.

### Pig Iron Measuring Industry

In fact, pig iron production, as usual, has been a measure of industrial activity. For example, the irregular business conditions that prevailed in 1926 are well illustrated by the iron production curve, which shows industry at a rather high level, but tending to decline after the first quarter and distinctly lower in the second half of the year than in the first. The

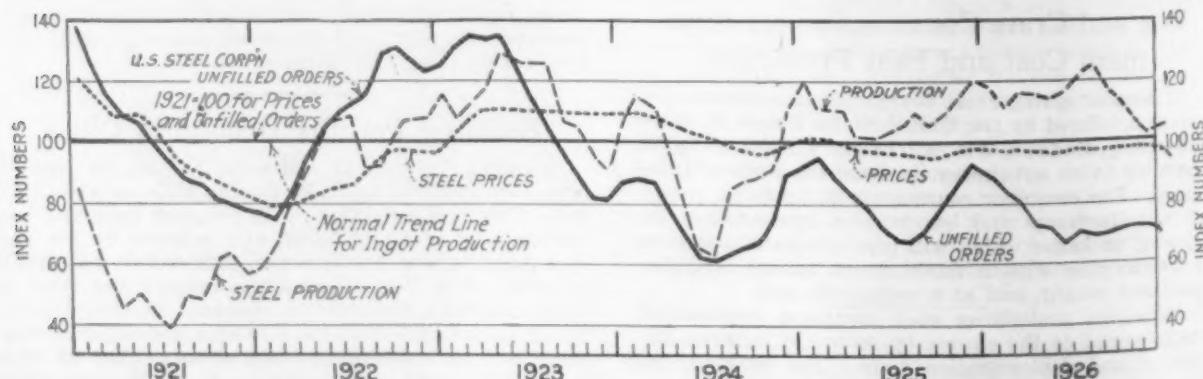


Fig. 1—Steel Corporation Unfilled Orders Are Lower Than at the Opening of Any Other Recent Year. January showed a loss, in place of the usual gain. Ingot production, on the contrary, increased in January by more than the usual amount. Prices, after a long period of stability, are dropping

# In This Issue

*Scrap-bearing pig iron makes it difficult for foundrymen to calculate proper cupola mixture.*—Pig iron is not so good as it was in former years, says Dr. Moldenke. Foresees a spread of the practice of specifying carbon content in buying iron.—Page 575.

*Regular use of open-hearth slag in the blast furnace is not favored.*—Three to four per cent has been used, chiefly to recover the manganese in the slag, but its use is not popular.—Page 560.

*French competition will be felt chiefly on semi-finished materials.*—France can consume only a small portion of the iron and steel she produces, and her exports will consist principally of materials on which the labor item is relatively not large.—Page 567.

*Forecasts a further decline in scrap prices.*—But there is no indication of a sharp recession, says Dr. Haney.—Page 584.

*Automotive output gained sharply in January.*—Production of 234,130 vehicles was 41 per cent over December, but was the lowest January since 1922.—Page 578.

*High temperature and high carbon go hand in hand in pig iron making.*—Tests reveal that carbon and silicon increase and sulphur decreases as temperature is raised, in making basic iron with by-product coke.—Page 560.

*Malleable foundries want pig iron of 3 per cent carbon or less.*—Though blast furnaces could hardly produce such iron regularly, an auxiliary installation might enable them to do so. A 3 per cent iron would eliminate many of the difficulties malleable foundries are meeting today.—Page 560.

*Iron output is higher than demand warrants, Dr. Haney believes.*—He predicts several months of subnormal output. Says pig iron prices are near rock bottom.—Page 587.

*Oxides, not carbon, cause open-hearth men's trouble with pig iron.*—The amount or form of carbon in pig iron has nothing to do with open-hearth difficulties, says Government metallurgist. Blames oxides, particularly as silicates.—Page 560.

*Makes an iron, almost carbon free, direct from the ore without using the blast furnace process.*—Ore is placed in a tubular furnace, through which hot gases are circulated. Estimates sponge iron can be made in Norway for \$16.25 per ton.—Page 565.

*Wholesale commodity prices are still dropping.*—January average was 146.9, as compared with 147.2 for December. Average is now below any month in five years, with a single exception.—Page 578.

*Denies State's right to dictate wages manufacturers shall pay.*—United States Supreme Court decides against Arkansas statute as applied to manufacturer. Minimum wage principle is dwindling in practice.—Page 594.

*High-speed steel business is being seriously harmed by buying on price alone.*—Formerly purchases were based on the opinion of men responsible for production. The present practice tends to cut prices at the expense of quality, probably resulting in an increase in the cost of results.—Page 594.

*Every tool must be hardened according to its use.*—There is no such thing as an ideal "universal temper." In the attainment of production records, the tool hardener is an important factor.—Page 595.

*Trends in the scrap market.*—Prices more steady as development and consumption show definite interrelation.—Page 593.

*Spanish plant utilizes American rolling mill practice.*—Direct rolling from blooming mill to rail and structural units is provided, with similar modern equipment in other departments.—Page 571.

# CONTENTS

February 24, 1927

New Production Foundry in South .....	557
Metallurgists Discuss Pig Iron.....	559
Eliminating Blast Furnace in Norway .....	562
Future of French Steel Exports .....	566
Rolling Mills at Sagunta, Spain .....	571
Research in Foundry Iron Needed .....	575

Rubber-Lined Steel Drums.....	569
Reinforcing Floor Beams.....	570
Simplified Packaging of Bolts and Nuts.	573
Proposed Freight Rate Reductions.....	574
Simplified Pipe, Valves and Fittings.....	574
To Use Car Ferries Between Plants.....	577
Core Ovens for New Buick Plant.....	577
Court Opposes Sympathetic Strikes and Boycotts .....	577
Imports of Anvils .....	578
Polishing and Buffing .....	581
Box and Crate Construction.....	583
Eight Large Condensers to Serve One Turbine Generating Unit.....	583
Industrial Significance of Standardiza- tion .....	588
Fewer Accidents in Steel Industry.....	591
Using Obsolete Tools.....	594
Deformation of Metals.....	595
Steel Drums with Removable Heads.....	607
Foremanship Courses Increase.....	616
New Trade Publications.....	626
Sales of Mechanical Stokers.....	578
Wholesale Prices Still Lower.....	578
Pittsburgh District River Traffic.....	578
Building Permits Decline in Cities.....	583
British Trade Heavier.....	588
January Sales of Sheets.....	595
Fabricated Steel Plate.....	612
Fabricated Structural Steel.....	612
Steel Barrels .....	612, 618
American Income 90 Billions.....	616

## MEETINGS

American Institute of Mining and Metal- lurgical Engineers .....	559
Testing Society Committees.....	591
American Society for Steel Treating.....	595
American Society of Mechanical Engi- neers .....	595
Eastern Blast Furnace and Coke Oven Association .....	618

## STATISTICAL

Ornamental Iron Work.....	576
Fewer Coke-Oven Accidents.....	578
January Automobile Production.....	578

## NEW EQUIPMENT

Multiple-Spindle Drills .....	579
Smaller Universal Iron Worker.....	580
New Boom and Crowding Device In- creases Capacity of Crane.....	581
Welded Structural Steel Construction Features Arc Welding Machines.....	581
Cold Saw Tooth-Cutting Machine.....	582
Oxy-Illuminating Gas Cutting Torch.....	582
Machine for Lacing Belts.....	582
Compound Slide with Power Angular Feed .....	583

## DEPARTMENTS

Business Analysis and Forecast.....	584
European Steel Markets.....	589
Editorial .....	592
Iron and Steel Markets .....	596
Comparison of Prices.....	597
Prices, Raw and Finished Products ..	599-601
Structural Awards and Projects.....	613
Reinforcing Steel Business .....	613
Non-Ferrous Metals .....	614
Railroad Equipment Buying .....	615
Personals .....	617
Obituary .....	618
Machinery Markets .....	619

## Serving the Industry in a Declining Market

NO reasonable seller or buyer questions the service performed by the responsible trade journal during a declining market. Especially is this true, if he gives the situation second calm thought. Far from disturbing business, the dependable medium, by laying bare the facts with a proper sense of proportion and without overemphasis on the extreme, proves a stabilizer that holds market swings in check. If no market news were published, one can readily imagine the damage that would be done the industry by the distortion and exaggeration incident to the rapid flight of rumor from mouth to mouth.

THE IRON AGE seeks to publish the facts and nothing beyond the facts. It refuses to be swept off its feet by cycles of opinion. Recently it sounded a note of caution against too much dependence on current forecasts of a reaction in the building industry. Similarly it has exercised care not to color beyond their promise certain favorable business indications.

*For News Summary See Reverse Side*

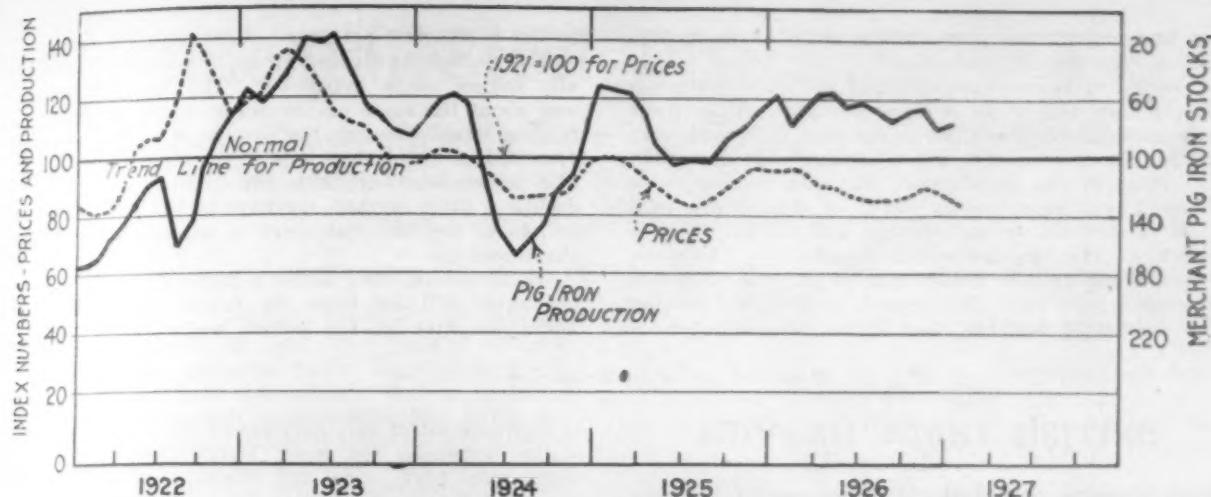


Fig. 2—Pig Iron Production Continues High in Relation to Steel, Though January and December Recorded the Lowest Tonnage in More Than a Year. A large decline is likely before long. The price is the lowest, for the season, since 1922

chart also shows that pig iron production was maintained at this high level in spite of lower prices, which is true also of commodities in general.

Of course, the soundness of this analysis depends in part on the correctness of our calculation of the line of normal growth—the long-time trend line of production. The changing technique of the iron and steel industry introduces an element of uncertainty, but thus far our basis seems not far wrong.

#### Early and Large Decline Probable

The conclusion may be drawn that the present level of pig iron production cannot be continued indefinitely. The longer the curve continues above normal, the greater the probability of an early and large decline. Now that European industry is recovering and the building and automobile industries have passed their peak in this country, it seems probable that below-normal months of pig iron production will begin to appear before long.

It will be noted that, throughout the last two years, the average price of pig iron, according to THE IRON AGE composite, has been close to \$20, and that, although \$20 is a low price level, a series of successively lower price waves has characterized the last three years. At the end of the series, in January, 1927, prices again point downward. The January average was \$19.40, against \$19.94 in December, and \$21.54 a year ago. In the middle of February, the figure was \$18.96. At present writing it looks as though the average would work slightly lower before recovery occurs, *although we think the price is very near bottom levels.*

Incidentally, the fact of declining prices, at the same time that production is declining but still high, makes

it almost certain that stocks of pig iron have recently been accumulating.

#### Prices Sagging in Unison

FIG. 3 illustrates the price situation. The Bradstreet index of commodity prices fell 2 per cent during January, and on Feb. 1 was 111.2 per cent of the 1921 average. This is the lowest point reached since July 1, 1924—which, by the way, was the low point of the last cyclical downswing. This index of commodity prices is about half-way back from the high point of last year to the low point in 1921.

What of steel prices? The finished steel composite price did not decline in 1926 as did the general price level, which is an unusual occurrence. It is decidedly unusual for the average price of finished steel articles to hold up so long while the Bradstreet index, scrap and pig iron all have been headed downward.

#### Finished Steel Weakness Foreshadowed

But with the last setback in the general level of commodity prices, finished steel has tardily succumbed, and the January average, as already noted, is appreciably lower than the December average. It is still, however, high in comparison with the general level of commodity prices. It is not down to the middle point between the peak reached in 1923 and the bottom touched in 1922, and the probability is that some further decline will occur, with weakness for another 30 days at least.

This conclusion does not run counter to the possibility of expansion in production. In 1921-22, prices declined for seven months after the ingot output turned

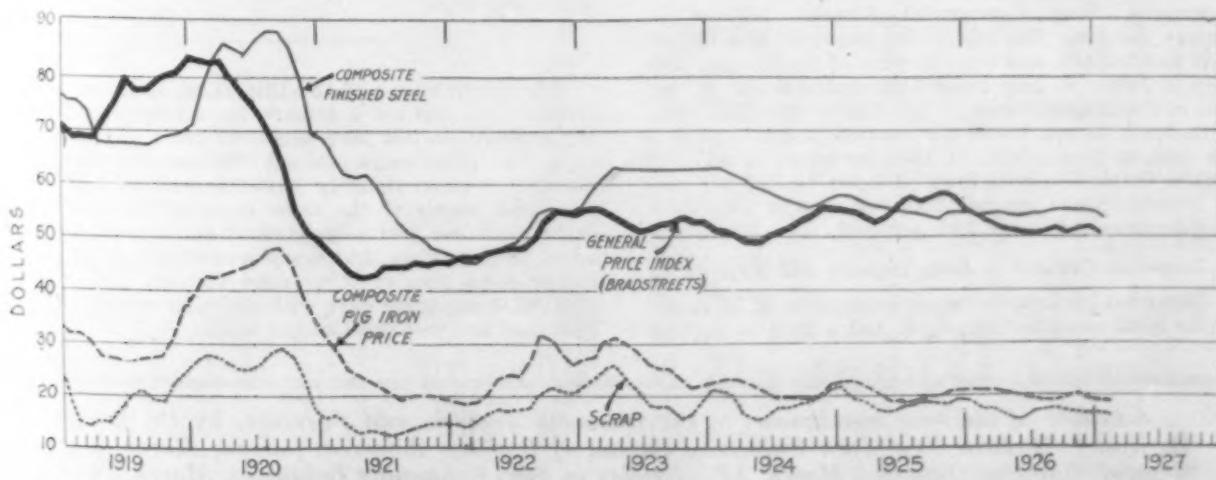


Fig. 3—Bradstreet's Index of Commodity Prices Has Fallen to the Lowest Level Reached Since Mid-1924. Finished steel, pig iron and scrap all have sagged during the past month, but finished steel maintained its level unusually long, while the three others were falling

up, and in 1924 the price decline lasted three months longer than that in production.

Yet the spread between steel and such raw materials as pig iron and scrap is none too wide. Must these raw materials decline? As to pig iron, it is very near the low price of recent years—nearer than low than any other of the main items. *Pig iron production in January was considerably lower in comparison with steel production, on an average daily basis, than in either of the two preceding months. It, therefore, seems likely that a firmer market for pig iron will develop before long.* At present, it is still following the downward lead of steel scrap, which began to

decline in October last year. What, then, of scrap?

Heavy melting steel scrap at Pittsburgh has gradually sagged since September. The January average was about the same as December, however, and scrap is considerably nearer the low point of recent years (reached in 1921) than it is to the high point of 1923. Our barometers lead us to the conclusion that it will decline a little further—perhaps to \$15.50—before the bottom is reached, but there is no indication of any sharp setback.

If, therefore, steel scrap is barometric of pig iron, the latter will not show the firmer trend, which we anticipate later on, for several weeks at least.

## BRITISH TRADE HEAVIER

### Both Imports and Exports Increased in January with Imports Preponderating

WASHINGTON, Feb. 19.—While January exports of iron and steel products from Great Britain reflect the recovery being made from the prolonged coal strike, totaling 219,369 gross tons, against 158,664 tons in De-

of 19 items out of 22. Receipts of steel bars, rods and angles increased the most, 16,429 tons, in January, while iron bars, rods and angles were second, with a gain of 8164 tons. Substantial gains were shown in a number of other items, including raw, semi-finished and finished material. The greatest import loss was in pig iron, which declined 14,828 tons.

Of the increases in exports in January, the greatest gain, 20,387 tons, was made in galvanized sheets, while plates and sheets, ranking second, gained 7150 tons.

*British Foreign Trade in Iron and Steel During December, 1926, and January, 1927*

(In Gross Tons)

	Imports		Exports	
	December	January	December	January
Pig iron and ferroalloys...	118,713	98,885	5,187	4,465
Ingots, blooms, billets and slabs	209,939	216,533	271	483
Iron bars, rods and angles...	26,596	34,760	1,110	3,760
Steel bars, rods and angles...	49,062	65,491	10,817	17,226
Structural steel...	20,214	25,661	2,687	4,874
Hoops and strips...	16,796	22,976	2,745	3,595
Plates and sheets...	45,177	45,448	11,384	18,734
Galvanized sheets...	...	...	44,818	65,295
Tin plate...	...	...	20,913	26,863
Cast tubes, pipes and fittings	5,031	7,464	4,482	5,063
Wrought tubes, pipes and fittings	5,946	7,008	17,634	22,376
Rails...	2,104	2,753	806	2,527
Other railroad material...	666	1,424	4,886	7,617
Wire...	7,263	7,439	5,316	6,536
Wire cables and rope...	...	...	1,630	2,027
Wire nails, including staples	3,778	7,167	249	424
Other wire manufactures...	658	951	1,107	1,821
Nails, tacks, rivets and washers...	698	1,075	1,326	1,420
Bolts and nuts, including screws for metals...	826	794	2,591	2,296
Iron and steel castings...	747	1,094	117	266
Iron and steel forgings...	1,273	1,125	65	26
All other manufactures of iron and steel...	6,648	7,405	18,320	21,765
Total...	517,135	555,453	158,664	219,369

ember, imports also continued high, mounting to 555,458 tons in January, compared with 517,135 tons in December. The figures are given in a cablegram received by the Iron and Steel Division, Department of Commerce, from Commercial Attaché William L. Cooper, London. The coal strike began in May of last year and imports and exports were of about equal tonnage in June. In July exports amounted to only 90 per cent of the tonnage brought in. This proportion rapidly declined, to reach 53.9 per cent in August and 35.9 per cent in September. It then increased to 48.7 per cent in October, only to drop off again to 39.4 per cent in November and reached 30.6 per cent in December. The January ratio was 39.2 per cent.

#### Increases General in Both Imports and Exports

December showed increases in imports of 16 items, of the total classification of 19, and a gain in exports

## Industrial Significance of Standardization

Among the arguments in favor of standardization of products, eight were listed in the Feb. 15 *News Bulletin* of the Division of Simplified Practice, Department of Commerce, as of primary interest. These eight are as follows:

1—Standardization stabilizes production and employment, since it makes it safe for the manufacturer to accumulate stock during periods of slack orders, which he cannot safely do with an unstandardized product.

2—It reduces selling cost.

3—It lowers unit costs to the public by making mass production possible, as has been so strikingly shown in the unification of incandescent lamps and automobiles.

4—By simplifying the carrying of stocks, it makes deliveries quicker and prices lower.

5—It eliminates indecision both in production and utilization, a prolific cause of inefficiency and waste.

6—By concentrating on fewer lines, it enables more thought and energy to be put into designs, so that they will be more efficient and economical.

7—It helps to eliminate practices which are merely the result of accident or tradition, and which impede development.

8—Joint effort in bringing about standardization within and between industries almost invariably leads to better understanding and to beneficial cooperation along other lines—a step toward the integration of our industries.

The South works of the Illinois Steel Co. at South Chicago has just set a remarkable safety record, having suffered no lost time accidents for a period of 50 days. The plant employs about 7500 men, and the period amounts to approximately 3,100,000 working hours. At the Joliet works of the same company the Bessemer department has just completed an entire year without a lost time accident, and every department at the plant has at some time or other since January, 1925, operated 365 consecutive days with a similar record. About 3000 men are employed at the works.

*Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: March 3—General Business Outlook; March 17—Activity in Steel-Consuming Industries; March 24—Position of Iron and Steel Producers.*

# Continental Steel Prices Advance

Increase of Ocean Freight Rate To India April 1 Causes Activity—German and British Mills Well Booked With Orders—German Steel Maker Calls Cartel Unsatisfactory

(By Cable)

LONDON, ENGLAND, Feb. 21.

PIG IRON business is quiet and supplies are restricted, but deliveries under old contracts are improving. Consumers are seeking cheaper iron but reductions are dependent upon fuel prices, which are again tending upward. Hematite iron is dull and increase in the output is hampered by high costs. Foreign ore is quiet with consumers' requirements satisfied for about three months.

Finished iron and steel demand is improving, but sales are still small as consumers are expecting lower prices. Makers are well booked with tonnage and not inclined to grant concessions. Production is proceeding satisfactorily with mills making good deliveries.

Palmer's Shipbuilding & Iron Co., Yarrow-on-Tyne,

is building a 10,000-ton oil tanker for a British company. Craig-Taylor & Co., Stockton-on-Tees, has been awarded the contract for two 8400-ton steamers by Humphries, Ltd., Cardiff.

Tin plate is quiet, but prices for forward delivery are becoming firmer. Galvanized sheet prices are easier with sales confined to moderate sized lots. Black sheets, No. 24 gage, are weaker. Japanese specifications are unchanged.

Demand for continental material is expanding, particularly from India, as Continental freight rates to India are to be advanced on April 1. British consumers of semi-finished steel are showing more interest in purchasing as Continental producers are increasing prices. Welsh tin plate bars have been reduced 5s. per ton to £6 10s. (\$31.52) delivered, but foreign bars are still obtainable at about £5 (\$24.25), delivered.

## GERMAN TUBE MILLS ACTIVE

### Wire Rod Entente Drops Export Control—Non-Members of Cartel Prosper

HAMBURG, GERMANY, Feb. 9.—German tube mills are active at present on sizable business from both domestic and export markets, although current German prices are slightly higher than the quotations of French and Belgian makers. The price schedule varies widely, as the tube and pipe association is not yet complete, controlling only about 74 per cent of the total production. In the present situation, mills outside the association are apparently securing more business than members of the syndicate.

Export business is reported to be particularly active with South Africa and the Far East, as well as several near eastern countries. Prices quoted on gas pipe vary considerably with black pipe quoted at 78 to 75 per cent off list (British standard) and galvanized tubes 67½ per cent to 65 per cent off list. Deliveries

of four to six weeks are being offered on tubes.

There has been a sharp reduction in prices of wire nails in Belgium and Germany, despite the mutual agreement to maintain the price level. Belgian mills have reduced prices to £9 15s. per ton (\$2.14 per 100 lb. keg) and less on nails varying from 1 to 6-in. long and Nos. 6 to 14 gage, packed in kegs of 100 lb. German makers have reduced quotations to £10 2s. 6d. to £10 5s. per ton (\$2.22 to \$2.25 per keg), but refused to go lower, so that Belgian mills are now booking the bulk of the wire nail export business. Other prices on wire products continue unchanged.

The wire rod entente of manufacturers in Germany, Belgium, Luxemburg and Holland has fixed export prices at £5 15s. per ton (\$27.88) for export to Great Britain and at 72 florins for export to Holland. Export prices to other foreign markets are not fixed, a change in the policy of the entente, which heretofore has set export prices for all countries. In a measure it means no further price regulation. As a result wire rods can be purchased today as low as £5 10s. to £5 11s. per ton (\$26.67 to \$26.91) if the tonnage involved is

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.85 per £ as follows:

	£1	6s.	to £1	7s.	\$6.30	to	\$6.54	
Bilbao Rubio ore f.	1	2	to 1	2 ½	5.33	to	5.45	
Cleveland No. 1 fdy. (nom.)	4	7 ½			21.22*			
Cleveland No. 3 fdy.	4	2 ½			20.00*			
Cleveland No. 4 fdy.	4	1 ½			19.76*			
Cleveland No. 4 forge	4	1			19.64*			
Cleveland basic (nom.)	3	15	to	3	15 ½	18.18	to	18.30
East Coast mixed	4	10	to	4	11	21.82	to	22.06
East Coast hematite	4	8	to	4	12 ½	21.84	to	22.43
Rails, 66 lb. and up	7	15	to	8	0	37.58	to	38.80
Billets	7	5	to	7	10	35.16	to	36.37
Ferromanganese (export)	16	0			77.60			
Sheet and tin plate bars, Welsh	6	5	to	6	10	76.38		
Tin plate, base box	0	19 ¾	to	1	0	30.31	to	31.52
Black sheets, Japanese specifications	15	0	to	15	10	4.75	to	4.85
Ship plates	8	10			72.75	to	75.17	
Boiler plates	10	15	to	11	5	1.84		
Tees	8	15	to	9	5	2.32	to	2.43
Channels	8	0	to	8	10	1.89	to	2.00
Beams	7	15	to	8	5	1.67	to	1.78
Round bars, ½ to 3 in.	8	5	to	8	15	1.78	to	1.89
Steel hoops	10	10	and	11	0	2.28	and	2.39
Black sheets, 24 gage	11	2 ½	to	11	7 ½	2.32	to	2.46
Galv. sheets, 24 gage	15	2 ½	to	15	10	3.27	to	3.35
Cold rolled steel strip, 20 gage, nom.	18	0			3.91			

\*Export price, 6d. (12c.) per ton higher.

†Ex-ship, Tees, nominal.

### Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron : (a)			
Belgium	£3 13s.	to £3 18s.	\$17.70 to \$18.90
France	3 13	to 3 18	17.70 to 18.90
Luxemburg	3 13	to 3 18	17.70 to 18.90
Basic pig iron :			
Belgium	3	3	16.49
France	3	3	16.49
Luxemburg	3	3	16.49
Coke	0 18		4.37
Billets :			
Belgium	4 10		21.82
France	4 10		21.82
Merchant bars :			C. per Lb.
Belgium	4 19	to 5 1	1.09 to 1.11
Luxemburg	4 19	to 5 1	1.09 to 1.11
France	4 19	to 5 1	1.09 to 1.11
Joists (beams) :			
Belgium	5 0		1.10
Luxemburg	5 0		1.10
France	5 0		1.10
Angles :			
Belgium	5 0		1.10
1/4-in. plates :			
Belgium (nominal)	6 11		1.49
Germany (nominal)	6 11		1.43
1/8-in. ship plates :			
Belgium	6 1		1.33
Luxemburg	6 1		1.33
Sheets, heavy :			
Belgium	6 3	to 6 4	1.33 to 1.34
Germany	6 3	to 6 4	1.33 to 1.34

(a) Nominal.

of sufficient size. The former price of the association was £6 2s. 6d. (\$29.70), f.o.b. Antwerp.

Austrian and Hungarian makers of wire netting, non-members of the International Raw Steel Cartel, have had such heavy bookings of business lately that almost all such manufacturers in the two countries are out of the market, fully engaged until well into July. Many have increased their capacity and almost all are operating on a 24-hr. schedule. German wire netting manufacturers, not members of the International Raw Steel Cartel are booked with business for three to four weeks. German and Belgian wire netting makers, which are members of the cartel are quoting higher prices than the outsiders and offering eight to 12 days delivery.

## STEEL CARTEL THREATENED

### German Mills Dissatisfied—Steel Man Urges Larger Quota or Fixing Export Prices

The immediate future of the International Raw Steel Cartel is, at present, somewhat indefinite. In France it is rumored that the existence of the cartel will be threatened before long by the German members, who are finding excessive the fines that must be paid under the terms of the agreement, \$4 per ton being levied on all producers who exceed their quota. It is further pointed out among French mills that the full quota of the cartel for all members was increased in November at the suggestion of German members and later decreased by their request.

At the recent annual meeting of the Société Industrielle du Nord de la France, M. Lambert-Ribot, of the Comité des Forges de France, outlined the European iron and steel situation and its relation to the steel cartel. In concluding his remarks, he pointed out that the cartel leaves to its different members complete independence of action on their markets, prices and sales methods. He pointed out that it was neither a sales organization nor a comptoir. As the compensation of \$2 per ton to members falling below their quota applies only to a 10 per cent deficit, he explained that there was no adequate reason for the cartel to cause a continued and serious curtailment of output, as in the end it would prove far from profitable.

In French industrial circles it is felt that Germany has too considerable an interest in the cartel to deliberately wreck the organization, which was in part formed as a result of German efforts. It is pointed out that German mills are wrong in overproducing in excess of their quotas, but that this does not in any way imply that Germany wishes to sever the links connecting with the other producing countries of Europe.

### A German Statement

Statements that are felt in some quarters to be at least a partial reflection of the attitude of German mills toward the cartel, were recently made by Paul Reusch, director general of the Gutehoffnungshütte and chairman of the Rhenish Chamber of Commerce. Dr. Reusch is generally considered as expressing the viewpoint of German industry and his remarks were made at a meeting of the chamber of commerce, attended by important leaders of the steel industry.

He said that the International Raw Steel Cartel was the only drawback of 1926 and that if German industry could have known how unsatisfactorily the cartel would operate, it would never have been accepted. The principal purpose of the cartel, he said, was stabilization of prices and yet prices are sliding downward as a result of the heavy competition from the West. In addition, he said that Germany has to pay \$4 per ton for every ton of excess production and is at the same time suffering from declining prices, resulting from the keen competition from the western producers.

He said that German industry would have to ask for a much larger quota in the cartel, or as an alternate, the cartel will have to fix export prices, fining any member selling at a lower price an amount equal

The United Steel Works, through its export organization, the Stahlunion, G.m.b.h., has booked an order for about 30,000 tons of steel rails for the Jugoslavian railroads at £8 5s. per ton (\$40), delivered to the frontier. The greater part of the order will be paid for by the German Government on reparations account. It is also expected that the largest bridge in Europe, which is planned for the Danube near Pancsevo, will be placed with a German company, financed by a Dresden bank.

Russia is expected to award some important rail tonnages to German mills before long. The contract for the erection of a large open-hearth steel plant in Russia has been awarded to the Witkowitzer Eisenwerke, Czechoslovakia.

to the difference between the official schedule and the actual sales price. In conclusion he said that if neither of these propositions were acceptable, German industry would probably be forced to go its own way, as the present situation is intolerable.

Although this is by no means an official statement, Dr. Reusch is generally considered as the spokesman of the German Iron and Steel Federation and his statements are not without purpose.

In addition to public statements in both countries and reports of German dissatisfaction with the cartel, there is, in some quarters, the belief that political expediency enters into the present situation and that the continuation of the cartel may depend on the evacuation of the Rhine provinces.

### Simplification Progressing Rapidly Among German Producers

HAMBURG, GERMANY, Feb. 7.—Simplification of products in the iron and steel industry has been foremost in the activities of a number of associations, so that by the end of last year considerable progress had been made with standardized production completed in several branches of the industry. For example, German mills are now producing but one type of wire nail and one type only of special nails, such as cement-covered, ovals, jagged, etc., and one type of bolt and rivet. Also in tubes, sheets, hoops and beams, standardization has been carried out.

The associations working for simplification publish their proposals for certain types only in various papers and after all points have been cleared by discussion, these types are generally accepted unanimously by the industry involved.

### German Non-Ferrous Metals Cartel of Three Companies Dissolved

WASHINGTON, Feb. 21.—The German "Non-Ferrous Metals Cartel," formed by agreement in 1912 between the Metallbank & Metallurgische Gesellschaft, the Metallgesellschaft and the Deutsche Gold & Silber-Scheideanstalt, all of Frankfort, has been dissolved, according to a report from the Consul at Frankfort-on-Main, Germany, made public by the Department of Commerce. In practice, the dissolution of the Non-Ferrous Metals Cartel signifies an absolute change in the business organization of the three firms, the report says, inasmuch as the interest agreement provided for a very close cooperation, as well as for a record and proof of the results of all business activities.

United States Senate Bill No. 5329, providing for an increased appropriation of \$155,500 for the United States Bureau of Mines, received the unqualified endorsement of the Department of Mines and Mining of the Sacramento Chamber of Commerce at a recent meeting, and California representatives in Washington have been asked to give their support to this measure.

# Fewer Accidents in Steel Industry

Bureau of Labor Statistics Data Point Out Decrease of 62.1 Per Cent in Frequency of Mishaps and 51.9 Per Cent Drop in Severity Over 15-Year Period

WASHINGTON, Feb. 21.—There has been a steady decline both in accident frequency and severity in the iron and steel industry since 1910 when the Bureau of Labor Statistics, Department of Labor, began collecting accident data of the industry. From 1910 to 1925 the decline in frequency in the iron and steel industry was 62.1 per cent and in severity 51.9 per cent. This steady and quite considerable decline, the bureau's announcement said, is also shown in all departments, with the exception of foundries. Considered from the standpoint of accident severity machinery causes the greatest amount of damage, while handling of tools and material is the major factor in the frequency of accidents.

Rates were computed at the end of each month for the years from December, 1913, to December, 1924, in specific units of the iron and steel industry. The following reductions in frequency rates appear: Fabricated products from 100.3 to 33.4, or 66.6 per cent; sheets from 61.6 to 10.3, or 83.8 per cent; wire products from 59.3 to 6.2, or 89.5 per cent; tubes from 27.2 to 5.1, or 81.3 per cent; first group of miscellaneous steel products from 70.9 to 11.8, or 83.4 per cent; second group of miscellaneous steel products from 41.3 to 7.9, or 80.9 per cent; total, from 60.3 to 10.2, or 83.1 per cent. "It is doubtful whether any other equally hazardous industrial group can show a better record," the bulletin declares.

## Accidents in Handling Most Numerous

Accidents due to handling were the most numerous in the industry as a whole, but decreased during the 1913-1924 period from 26.7 to 3.85, a decline of 85.6 per cent. Nearly half of these handling accidents resulted from dropping heavy objects when handling, and many other workmen were injured by falling. These classes of injury are due almost entirely to lack of skill on the part of the worker, and the declines are admitted to be the result of proper selection and training of the working force.

If it were possible to present severity rates, they would show that accidents due to machinery are less numerous than those due to handling, but are much more serious. The decline in the frequency of this type of accident was from 7.3 to 2.03 per cent. Cranes were responsible for the greatest number of these accidents.

## Records of Various Departments

The blast furnace, which must be regarded as one of the most hazardous departments in the industry, because of the occurrence of accidents causing death or injury to several men at a time, shows a decline over the 1910-1925 period of 72.4 per cent in severity and 54.2 per cent in frequency. In the Bessemer department there is also a general tendency to decline, although the change from year to year is erratic. From 1910 to 1925 there was a decline of 92.9 per cent in frequency and 55.8 per cent in severity.

The open-hearth department also shows a decline in both frequency and severity in the latter of 62.2 per cent and of 74.3 per cent in the former. The foundry, when compared with the basic metallurgical department, shows a distinctly lower accident severity rate and a much higher accident frequency. From 1914 to 1924 there was a decline, based on five-year periods, of 1.4 per cent in frequency and 22.2 per cent in severity.

This material is part of the fourth bulletin, number 425, which the department has just published, showing the latest statistics of industrial accidents on a national scale which bring the data up to 1925. The bulletin

says that the three Federal agencies collecting accident statistics, the Interstate Commerce Commission, the Bureau of Mines and the Bureau of Labor Statistics, have so improved their methods of collecting and handling accident data that their statistics on railroad, mining and the iron and steel industry, respectively, while naturally not entirely complete, may fairly be claimed to be trustworthy. While the States have collected a mass of statistics, it is pointed out, unfortunately, that they have adopted different procedures, which makes it difficult to combine their records into a national compilation. The Bureau of Labor Statistics, in its effort to promote accident prevention, has suggested five items that are essential in effective accident statistics: Exposure to hazard; number of accidents; severity of accidents; classification by industries; and causes of accidents. No State covers all these items and in most States no attempt is made to cover the very important item of exposure to hazard. Some States make no accident reports.

## Industries Showing Recent Declines

In 12 industries there was a decline in accident frequency from 1924 to 1925, the greatest being in the following industries: Automobiles (58 per cent); agricultural implements, and electrical machinery (each 49 per cent); and planing mills (46 per cent). In six industries there was a rising frequency rate, the greatest increase being in the boot and shoe industry (150 per cent), followed by those in the stove industry (56 per cent) and in the flour industry (42 per cent).

In accident severity also there was a decline in 12 industries, electrical machinery (73 per cent), glass and stoves (each 59 per cent), and machine tools (52 per cent) having the greatest decline, while in six industries accident severity increased, the greatest increase being in structural iron work (97 per cent), flour (81 per cent), and agricultural implements (74 per cent).

## Testing Society's Committees to Meet in Philadelphia in March

Definite announcement is made by the American Society for Testing Materials that group meetings of a large number of committees and joint committees of the organization will be held in Philadelphia, March 15 to 18, in the Bellevue-Stratford Hotel. Some of the committees which will participate in these meetings are the following: A-1 on steel, A-2 on wrought iron, A-3 on cast iron, A-5 on corrosion of iron and steel, A-6 on magnetic properties, A-8 on magnetic analysis, B-1 on copper wire, B-2 on non-ferrous metals and alloys, B-3 on corrosion of non-ferrous metals and alloys, D-5 on coal and coke, E-4 on metallography, and sections of committee E-1 on thin sheet metals and on tension testing.

The Canadian Government Merchant Marine, Ottawa, Ont., has decided to build, instead of purchasing, the additional ships required to give the special service required between Canada and the British West Indies provided for in the trade treaty effected some time ago. Five ships will be built, and tenders will be called immediately for their construction. Three of the ships will be built in Canada and two in the United States. The cost is estimated roughly at \$500,000 per ship.

ESTABLISHED 1855

# THE IRON AGE

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## Marks of Prosperity

THE term "prosperity" has been somewhat overworked, according to the views of some who see a propagandist use, political or otherwise, of the term. Question is sometimes raised whether we are "getting along" to the extent alleged, the assumption being that this process involves accumulation of wealth in material things. The definition thus inferred may be strictly accurate from an economic viewpoint, but not as a matter of diction, for the root of the word is hope, prospering being essentially the opposite of despairing, involving the attainment of one's hopes.

People, then, are the arbiters of the question whether they are prospering, or attaining their hopes. The hope may be an automobile and three—or more likely only one or two—square meals a day. Steady employment at good wages, which are present wages, makes the rank and file of the people, or at least the great majority of them, prosperous according to their own view.

In some quarters the generic idea is that man never is, but always to be, blessed and accordingly prosperity would mean increase in material and productive wealth, to yield still better things in future. Such observers, given an annual inventory of the physical wealth of the United States, would measure prosperity according to the rate of increase in this inventory.

There is a measure of one part of such accumulation that is up to date and is reasonably trustworthy, and that is capital issues. For last year these were as tabulated, according to summaries of the Federal Reserve Board. The figures do not include refunding.

### Capital Issues

Domestic .....	\$5,128,900,000
Foreign Government .....	633,800,000
Foreign corporate .....	399,000,000
Total .....	\$6,161,700,000

An estimate, rough but amply close for the present purpose, is that the total income of the people of the United States last year was 90 billion dollars, whereby these capital issues would

represent about 7 per cent of the total income. It is true that capital issues may be made for the purpose of purchasing properties already created, but not a great deal of that is done, the issues in the main representing the creation of physical wealth.

A heavy volume of physical wealth is created without capital issues. There is a large amount of construction in dwellings, apartment houses, hotels, office buildings, hospitals and public buildings, and in connection with the total of that there is very little of capital issues. Large depreciation allowances must be made, but even then it seems clear that more than 10 per cent of the income of the people of the United States is being represented in increase of their physical wealth.

We have now reached ground that is partly speculative, but from which a point of wide significance is visible. Our savings (additions to physical wealth), perhaps nearer 10 per cent than 20 per cent of income, may seem small in proportion to income, but they are large in actual amount. As to what was occurring up to the beginning of the present century there are meager data, but enough basis for conjecture that formerly we were accumulating wealth at rates of from 20 to 35 per cent of income. It may not be far out to take it that the percentage rate now is one-half the rate prevailing up to 15 or 20 years ago.

Without any thought of such figures, many are deplored our luxurious and spendthrift ways, in contrast with the frugality of past generations. Others point out in substance that we are getting what we want. Both may be quite right. We have achieved circumstances entitling us to do what we are doing, if that is the way we wish to "prosper."

REFORM in State and local tax administration methods and in the reduction of the present tax burden will owe much to the movement known as the "Better Understanding Between Industry and Agriculture." A plan outlined by industrial and agricultural leaders at a recent meeting calls for the creation in each State of a group made up at first of the State grange master, the State farm

bureau president, and the president or secretary of the State industrial association. With those three groups cooperating in the preliminary activity, other State groups, such as the bankers, transportation officials, local chambers of commerce, civic organizations, etc., will be invited to join in the effort to exert some control in tax matters.

### Further Research in Pig Iron

IS there need for new research into the composition of pig iron? Do present complaints of foundries and steel makers arise from deterioration in the quality of the iron? Have the character and quantity of carbon in iron any bearing on the question? The iron and steel committee of the American Mining and Metallurgical Engineers arranged a profitable round table discussion at the annual convention last week, some features of which are reported on other pages.

The fact that some blast furnace operators are using large quantities of scrap in their burden and pushing for output is pointed out as possible cause for poor pig iron. The contention is that too much scrap is likely to contaminate the iron and too fast working will introduce oxides and metalloids in quantities too large to be eliminated or corrected in later operations, particularly in steel furnaces. The use of scrap for over 50 per cent of the burden and the production of 1000 tons in one day from a stack rated for 500 to 600 tons are cited as examples of damaging practice.

The net conclusion of the conference last week was that, while there is something wrong somewhere, the quantity and state of the carbon are not the cause. The gray iron foundry interests feel that help is needed to preserve the industry. Some steel makers insist that the removal of non-metallic inclusions, always a problem under the best condition, has been handicapped by recent blast furnace practice.

Research of splendid promise is now under way in the steel-making field by Dr. C. H. Herty, Jr., and his associates, but very little is known or being done about the foundry branch. Neglect of the gray iron industry has come in part from a belief in many quarters that its technology in all important points had been thoroughly evolved. Foundrymen would welcome suggestions as to how and by whom this further research work should be done.

### Merchandising Principles in Scrap

NEW problems have been constantly presenting themselves to the trader in scrap. For a year and more he has felt himself in particularly trying circumstances, on account of changes in merchandising methods of those with whom he dealt, but perhaps it is partly a case of not well remembering the troubles of previous times.

Until very recent years the scrap market had a fashion of swinging over quite a range of prices. Both the range and the period varied, but in general the principle was that prices went low enough for dealers to fill their yards, and then high enough to enable them to liquidate at a profit. The swing

had to be sufficient to cover the extra freight, the cost of handling, the deterioration, interest on investment, and finally a profit.

Of late the scrap market has not been doing that. It does not cover the real point to charge that freight rates and labor costs have increased. The conduct of originators of scrap and consumers of scrap has changed. Some yard accumulating does occur, but it is almost wholly of scrap which the yard manufactures; it comes from material purchased in form not suitable for direct delivery to consumers.

It may be difficult to distinguish fully between cause and effect, but at the same time that scrap prices have been tending to have narrower swings, both originators of scrap and consumers of scrap have come to expect a more stable market. A declining market met with resistance on the part of originators, expecting higher prices again, and an advancing market met with resistance on the part of consumers, expecting a lower market again.

This is only part of the story in the narrowing price range in scrap market fluctuations. Both the development of scrap and the consumption of scrap have grown steadier. As was pointed out in this department of THE IRON AGE Sept. 2, 1926, a larger proportion of the steel made is going for what may be called upkeep, rather than for wholly new construction, than formerly. This tends to make the outcome of scrap steadier. Production of steel has grown much steadier, partly from that influence, partly also because buyers do not overplay the market, accumulating stocks of steel at one time and liquidating at another. It is notable that year by year lately the steel works have run more steadily. The flow of scrap is thus smoother and opportunity for dealer speculation is minimized.

The scrap dealer does not necessarily become less useful. His function is to do such things as he can do better than others, and he must ascertain from time to time as conditions change just what those things are. If as some dealers assert there are too many dealers, then the natural process will leave the survivors more fit than if all had survived. The turnover itself is bound to grow. An increasing percentage of the growing steel production will be made from old material and industrial scrap, and there will always be occasion for dealers to handle a large part of this new and old scrap.

A PROPOS of the tendency of modern industrial efficiency to increase the leisure of the individual, some interesting observations may be made of the annual report of the United States Steel and Carnegie Pension Fund. Last year the average age of employees added to the pension roll was 62.79 years, as compared with an average of 66.87 years for those added since the fund was established in 1911. The period of employment for the additions last year averaged 31.57 years, comparing with an average of 32.59 years for additions over the 16 years of the fund's existence. Apparently there is an average of four more years of leisure for employees retired in 1926 than has been the average since 1911. Also one year less of service sufficed to arrive at retirement than was the case for those who preceded them. The beneficiaries of this pension

fund make no contributions to it, the income being derived from a fund created jointly by Andrew Carnegie and the United States Steel Corporation.

### Another Minimum Wage Law Fails

**A**NOTHER blow to the principle of minimum wage as applied to manufacturing industry has been dealt by the United States Supreme Court. A recent decision holds unconstitutional the Arkansas statute regulating wages which may be paid to women employed in factories. A maker of work clothing had instituted an action against the State, setting forth that its plant had been operated at a loss, and the enforcement of the decree of the Arkansas Industrial Commission was depriving the firm of property without due process of law, in violation of the fourteenth amendment. The Supreme Court confirmed the findings of the United States District Court.

No State-wide arbitrary rule can be fixed as to what a manufacturer can or cannot afford to pay his employees. A flat minimum wage scale that would be low in a large city might be high in a country village, where living costs may be less. An industry located in a State which had a compulsory wage rate might find it impossible to meet competition from another State without the minimum wage law.

Applied to mercantile establishments within a State the minimum wage has gone into practice, for, as every merchant in a community must conform to it, it ceases to be a factor of competition. But this is not the case with manufacturing. Arkansas is now placed with the District of Columbia, Kansas and Arizona for having laws that are unconstitutional. Other States have repealed the law; still others have failed to enforce it. In few States has it obtained a foothold. The minimum wage principle as applied to manufacturing is dwindling in practice.

### What of Progress in High-Speed Steel?

**I**S the high-speed steel market today approaching a condition prophesied by some of the opponents of standardization? It is unfortunate that a steel which has done so much for industry during the past twenty-five years should become one of the less profitable forms—so much so, that a rhyme being circulated among the users of steel by one well known company closes with the lines: "But anything is preferable to selling high-speed steel."

High-speed steel purchases used to be based almost entirely on the opinion of the men responsible for production. It was prejudice in some places, but a prejudice based on experience. The user named the brand he preferred and the buyer seldom did more than to try to secure the best price on the brand requested. He did not suggest other brands, because the relation between high-speed steel prices and manufacturing costs was perhaps more frequently discussed than at present.

The war shortly developed a shortage of high-speed steel both here and abroad. The shop superintendent or foreman met imperative needs by using whatever the purchasing agent could find.

Often the results were disappointing and costs increased, but they were absorbed with other wastes of emergency production. In three years, probably no steel remained outstanding, because of the abnormal conditions in the way of equipment, working hours, unscientific handling and unfamiliar materials machined.

After the war, large stocks of mixed steels had to be absorbed and, in the period of deflation, the shop was urged to make the best of the material on hand. Laboratories were consulted and indicated the compositions which should be used for various purposes. Defining in specifications the limits of analysis and other characteristics served a useful purpose, but it obscured the relation of the cost of the steel to its quality.

The actual consumption of high-speed steel per machine per day may be, say, a matter of only 4 to 12 cents, while the output of the machine may be \$4 to \$12 a day. If one steel costing twice as much as another steel makes possible an increase of only 2 to 4 per cent in the productive capacity of a man and machine, this steel is cheaper than the steel of less capacity, even though the latter were supplied free of charge. The increased value produced would be worth two to four times the total cost of the steel, or many times the difference in cost price.

To accept the metallurgists' specifications in place of a quick dependable method of testing cutting capacity, which now seems lacking for universal application in ordinary shop practice, tends to a standardization which leads to price competition. The result is an effort to reduce costs rather than to improve cutting qualities. Certainly the cost item has been studied, seeing that, in the face of high steel labor and materials costs above the pre-war level, the selling prices on many brands are below the pre-war averages.

The indications in the high-speed steel field thus are that standardization and price competition threaten to prove detrimental to the buyer as well as the steel maker. Clearly the standardization matter needs to take into consideration cutting capacity.

### CORRESPONDENCE

#### Using Tools of 1900 A.D. in Machines of 1927

*To the Editor:* The key man in the tool hardening department who secures worth-while results must know how to think, reason and apply results to future activities. In all fairness to him and the results desired (greater production per tool) he should have available for his use at any and all times the opportunity to counsel with his engineering, production and time study departments, the shop foremen and the machine operators. He should have the complete picture of the tool consuming plant before him. Anything less than this forces him to become as a machine, simply treating tool steels.

There is no prepared course of study open to the modern tool hardener. In the hardening of tools we are dealing with an art, not a science.

The tool hardener should be kept informed of the pertinent developments in his line through the trade

journals, Government documents and contact with the engineering societies. This information is readily available to all manufacturing plants and is often found in the hands of the higher executives, where it frequently dies in a traffic jam.

The ideal tool hardener is a student regardless of his age. His most fertile field of study lies in the plant at the machine where the products of his furnaces are being tried in the crucible of service. Give him an opportunity to get out in the shop and determine how the tools treated today compare with those used last month on the same job. If he is a student, he will determine how to instill greater production into his products. If he is not a student, there will be no production increases and his services should be transferred from that particular department.

The tool hardener is the most important man in the metal working plant. Why? Because no machine is any more efficient than the tools with which it is equipped. Would you think of purchasing for present use the machines which were in universal use at the opening of the present century? Try to visualize that in so far as temper is concerned, your modern up-to-the-minute machine is being equipped with 1900 A. D. tools.

## JANUARY SALES OF SHEETS

### Ahead of December by 9 Per Cent—Higher Production and Shipments Also

SALES of sheet steel by independent manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers registered another substantial increase last month. December sales were 55,627 tons larger than those of November and last month's bookings ran 20,495 tons ahead of those for December. Unfilled orders at the end of January were 3390 tons less than one month before, against an apparent increase of 22,338 tons, the excess of January bookings over shipments. Orders on hand awaiting shipment at the end of January were 5676 tons larger than at the end of December, but January saw a decrease in the unsold stocks of 4208 tons. The figures in detail follow:

	1927		1926	
	January	December	November	January
Total No. of mills...	712	712	712	701
Capacity per month...	422,400	446,100	433,700	428,600
Per cent reporting...	73.5	73.8	73.8	75.6
Sales .....	261,357	240,862	185,235	241,040
Production .....	256,856	238,345	278,455	317,424
Shipments .....	239,019	219,498	262,797	283,645
Unfilled orders...	526,550	529,940	500,120	607,190
Unshipped orders...	116,687	111,011	124,135	91,363
Unsold stocks....	44,974	49,182	40,929	49,460
<i>Percentages to Capacity</i>				
Sales .....	84.9	73.1	57.8	74.4
Production .....	83.5	72.3	86.9	98.0
Shipments .....	77.7	66.6	82.0	87.6
Unfilled orders...	171.1	160.8	156.0	187.5
Unshipped orders...	37.9	33.7	38.7	28.2
Unsold stocks....	14.6	14.9	12.8	15.3

### Metal Deformation Discussed by British Metallurgist

Taking as his subject, "Modern Views on the Deformation of Metals," Dr. Cecil H. Desch, professor of metallurgy, Sheffield University, Sheffield, England, addressed the New York chapter of the American Society for Steel Treating on Friday evening, Feb. 18. This was the first of a series of lectures on various topics before several of the chapters, as well as before other organizations, in the next three weeks. Among the chapters to be visited are those at Cleveland, Pittsburgh, Rochester, New Haven, Hartford, Boston and Washington.

In introducing his lecture, Doctor Desch added that although he had been a member of the American Society for Steel Treating for a number of years, this was his first opportunity to address a unit of that large organization. Among the topics offered for various lectures, the one on deformation was evidently the

The principal reason for this is due to the misconceived theory of heat treating tools. The steel maker must of necessity recommend generalized treatments for certain steels. The tool hardener is conscientious in following the recommended practice with the result that a "universal temper" is applied to all tools made from those steels.

There is no sane reason for treating all tools alike. Particular applications require particular treatments. The problem of machining cast iron is far removed from the cutting of tough alloy steels or the non-ferrous metals. And yet a bunch of high speed steel tools will be heated to 2350 deg. Fahr., drawn to 1050 deg., and one will be used on cast iron, one on brass and another on steel.

If the temper of one is right, the others must be wrong. This is why there is no "universal temper." Each tool must be treated to meet its particular application, if you are attempting to hang up high production records and this is the reason the tool hardener must be a student using the machine shop as his class room and the machine using the tool as his professor.

E. V. GILBERT.

Collinsville, Conn.

most popular, as it had been selected by several chapters. He testified that he had found, since his arrival here only last week, that much work had been done and was being done in this field on this side, and that he did not know of and in a limited sense he was therefore behind the times. In any event, on this subject no dogmatic ideas are yet possible and the entire question is in a state of flux. Rapid results are being obtained, but no complete theory is yet offered. His lecture, illustrated with lantern slides, took up various theoretical phases of the subject.

### Chicago Engineers to Hold Machine Shop Practice Meeting

The Chicago section of the American Society of Mechanical Engineers will hold a symposium on machine shop practice at the Machinery Club, Chicago, Wednesday, March 16. There will be an afternoon and an evening session, with a dinner meeting between. Members of the Machinery Club, the mechanical division of the Rotary Club, the Western Society of Engineers and the National Pressed Metal Society, as well as others interested in modern manufacturing methods, have been invited to participate.

A motion picture showing methods used in the manufacture of watches at the Elgin National Watch Co., will open the meeting. Following the picture will be the presentation of two papers, one on "Changing Manufacturing Methods to Reduce Costs," by A. Langsner, chief engineer of the Eugene Dietzgen Co., and the other on "Stellitizing of Metal Parts Subjected to Wear," by E. F. Smith, district sales manager of the Haynes Stellite Co.

"From Mine to Consumer," a motion picture showing rolling mill operations, extrusion methods, laboratory control and other procedure at the plants of the American Brass Co., will open the evening session. A feature of the meeting will be an address by E. F. DuBrul, general manager of the National Machine Tool Builders' Association, who will speak on "The Engineers' Contribution to the Growth of Machinery." Possibilities in handling parts automatically and factors which govern the use of automatic devices will be outlined in a paper on "Automatic Feeding Devices for Machine Tools," to be presented by W. W. Nichols.

With a daily average of 30.4 miles the movement of freight cars on Class I railroads in 1926, like freight traffic itself, set a record according to the Bureau of Railway Economics. The freight traffic amounted to 488,577,875,000 net ton-miles which exceeded by 30,971,215,000 net ton-miles, or 6.8 per cent, the best previous record of 1923.

# Iron and Steel Markets

## Steel Demand Still Improves

Uptrend Is Met by Increased Mill Operations and Backlogs

Remain Small—Some Attempts to Stiffen Prices—

Keen Competition in Pig Iron

IMPROVED demand for finished steel is reported from all the leading producing centers. Outside of large pipe, tin plate and rails, the orders are almost exclusively for early delivery. Meeting the urgent calls by increasing mill operations results in backlogs remaining small.

The industry now appears to be operating at last year's average, or close to 85 per cent of capacity, with the Steel Corporation at several points above that figure and leading independents somewhat below. Ingot production is put at 80 per cent in Pittsburgh, compared with 77 last week and 75 two weeks ago. In the Chicago district the Steel Corporation has blown in the fourth stack in the past five weeks.

Satisfaction from the steady increase in bookings is modified by the low prices applying to much of them. What is virtually the buying of orders has not disappeared in some lines, but in others attempts to bolster prices have been made. On Monday several makers of hot rolled strips announced advances of \$2 to \$4 a ton. Resistance to price reduction is marked in the plate market. Late low quotations on wire nails are not now uncovered.

The strong feature of the situation is the large aggregate of the buying for widely diversified uses, the orders coming steadily into the market without the publicity attaching to business of spectacular size. The automobile industry is taking steel more freely, but commonly only for 30 days' needs and otherwise avoiding accumulations of stocks. Building work and the railroads at the moment are stronger in the promise than in the act of buying.

Fabricated structural steel work in prospect has been increased in the week by fully 47,000 tons, including 6000 tons for a New York bank building, 6000 tons for a hotel at Houston, Tex., 4000 tons for a telephone building at Dallas, Tex., and 11,500 tons for three buildings in Chicago. A 43-story structure proposed for Chicago would add upward of 10,000 tons. The War Department has given permission for a bridge over the Chesapeake Bay, requiring 35,000 tons.

Only 561 freight cars were ordered in the week. Twenty-one locomotives were bought and 24 are pending.

A Delaware River shipyard has bought 9000 tons of plates for three oil tankers.

The continued activity in pipe for the oil companies has added to mill books 65 miles of an 18-in. gas line for Louisiana and put under negotiations 78 miles of 8½-in. pipe and 60 miles of 6½-in. pipe.

Steel bar output has risen to the volume of last October, but in only a few sizes and with only a few makers are deliveries impossible with-

in a week or ten days, and unfilled tonnage does not accumulate.

Sheets are still subject to shading. Buying has been a trifle heavier, but some of it, it is worth emphasizing, has been for future needs and mill books do not immediately profit. Black and galvanized sheets are quotably \$1 a ton lower than last week.

January records of the sheet business of the independent makers show sales nearly 9 per cent ahead of December. Production and shipments were scaled up in the same ratio, and thus remained under the bookings as in December. A reversal for February may come, with expansion indicated in both output and shipments and little or no increase for the month in new orders.

Aggressive selling by Buffalo and other New York State furnaces is still a feature of the pig-iron market. On a large sale in New England as low as \$16.50, base Buffalo, was done on foundry iron for prompt shipment. Competition from Buffalo has also been felt as far west as eastern Michigan. Along the Eastern seaboard the low current prices have driven in an increasing volume of business, the week's total for the New England and New York districts totaling about 45,000 tons, some of which was for delivery into the third quarter. With their order books better filled as a result of generous bookings in recent weeks, there are indications of greater resistance on the part of some Eastern furnaces to the pressure against prices. The market is also steadier in the Cleveland district, where sales for the week totaled more than 50,000 tons.

English furnaces, for the first time since the British coal strike, are again a factor in low phosphorus pig iron in the East, offering April deliveries at competitive prices. Otherwise foreign pig iron is not a market factor.

The Donner Steel Co., Buffalo, is putting in a rebuilt blast furnace.

As the threatened coal strike approaches, the coke market shows further indications of strength. Reflecting a stocking movement in foundry coke, Connellsville prices on that grade have advanced 25c. to \$4.50, ovens.

Scrap is weaker in virtually all selling centers except Pittsburgh, where the market has been supported by dealer purchases to fill expiring contracts. At Chicago heavy melting steel has declined 25c. a ton.

THE IRON AGE composite price dropped from 2.374c. last week to 2.367c. per lb. This is the lowest level since August, 1922. Pig iron remains at \$18.96, as last week. No lower composite has been recorded since April, 1922, though the same price was touched in August, 1925.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics  
At Date, One Week, One Month, and One Year Previous

### For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 21,	Feb. 15,	Jan. 25,	Feb. 23,
	1927	1927	1927	1926
No. 2, fdy., Philadelphia	\$21.76	\$21.76	\$22.26	\$23.26
No. 2, Valley furnace	18.50	18.50	18.50	20.50
No. 2, Southern, Cin'ti.	21.69	21.69	21.69	25.69
No. 2, Birmingham	18.00	18.00	18.00	22.00
No. 2, foundry, Chicago*	20.00	20.00	20.50	23.00
Basic, del'd eastern Pa.	21.00	21.00	21.50	23.00
Basic, Valley furnace	18.00	18.00	18.00	20.00
Valley Bessemer, del. P'gh	20.76	20.76	21.26	22.76
Malleable, Chicago*	20.00	20.00	20.50	23.00
Malleable, Valley	18.50	18.50	18.50	20.50
Gray forge, Pittsburgh	19.76	19.76	19.76	21.76
L. S. charcoal, Chicago	27.04	27.04	27.04	29.04
Ferromanganese, furnace	100.00	100.00	100.00	115.00

### Rails, Billets, Etc., Per Gross Ton:

O-h. rails, heavy, at mill	Feb. 21,	Feb. 15,	Jan. 25,	Feb. 23,
	1927	1927	1927	1926
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	35.00	35.00
O-h. billets, Pittsburgh	33.00	33.00	35.00	35.00
O-h. sheet bars, P'gh	34.00	34.00	36.00	36.00
Forging billets, P'gh	40.00	40.00	40.00	40.00
O-h. billets, Phila.	28.30	38.30	40.30	40.30
Wire rods, Pittsburgh	43.00	43.00	45.00	45.00
Skelp, grvd. steel, P'gh, lb.	1.90	1.90	1.90	1.90

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.22	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.90	1.90	1.90	2.00
Steel bars, Chicago	2.00	2.00	2.10	2.10
Steel bars, New York	2.24	2.24	2.24	2.34
Tank plates, Pittsburgh	1.85	1.85	1.90	1.80
Tank plates, Chicago	2.00	2.00	2.10	2.10
Tank plates, New York	2.19	2.19	2.24	2.09
Beams, Pittsburgh	1.90	1.90	1.90	1.90
Beams, Chicago	2.00	2.00	2.10	2.10
Beams, New York	2.19	2.24	2.24	2.24
Steel hoops, Pittsburgh	2.20	2.20	2.25	2.50

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

## Pittsburgh

### Strip Prices Are Advanced—Ingot Output Reaches 80 Per Cent

PITTSBURGH, Feb. 21.—The tendency of steel buying and of steel plant operations continues upward, but this tendency is yet to make its appearance in prices, although several makers of hot-rolled strips on Monday announced a base of 2.10c. on stock 6 in. and wider and 2.30c., base, on sizes under 6 in. wide. This change, effective immediately, represents an advance of \$2 to \$4 a ton, as within the week there have been sales of wide strips at 1.90c., and on mixed lots of wide and narrow stock, 2.10c., base, has been done. The market is more settled on wire nails in this district than it was a week ago, and sales of large billets and slabs have been made at more than \$33, f.o.b. Pittsburgh. As a general proposition, however, the satisfaction derived from the steady increase in the bookings of steel is modified by the low prices at which most of the business has been entered. Ingot production in this and nearby districts now is easily 80 per cent of capacity, as against 77 last week and 75 per cent two weeks ago. This swing may be regarded as a measure of the improvement in business, although outside of large pipe, tin plate and standard-section rails, orders run heavily to early deliveries, and speeding up output not infrequently is necessary to meet that requirement. There is also the factor of increasing signs that no agreement will be reached before April 1 on the wage scales

for union coal mines and that there will be a suspension of these mines with some disturbance at the open shop mines.

Outside of the finished products mentioned, a two weeks' order book is rated a good one. There are, however, definite indications of larger demands from the automotive industry, and the structural steel fabricators appear to be figuring on more work than recently. Additions to railroad tonnage are not large, but there are signs of greater interest in supplies on the part of the agricultural implement manufacturers.

Pig iron transactions still are few and generally of small lots, with prices holding at recent levels, not because there is any scarcity but because the fuel situation, so far as it pertains to coke, is showing marked firmness. The scrap market is a shade firmer as a result of short covering by dealers, who are reaching the limit of their contracts and also fear that heavy snows will retard the movement of material from originating points.

**Pig Iron.**—Recent prices on Valley iron are holding. There is a report that on a sale by one steel company to another of 12,000 tons of basic iron, deliverable in equal monthly quantities over the next three months, a price of \$17.50, Valley furnace, was made, or 50c. a ton below the recent quotation, but neither of the companies mentioned in the deal will confirm the report. The Walworth Co. is in the market for 4500 tons of foundry iron for its South Greensburg, Pa., works, but Valley furnaces do not expect to share in this business. Against a freight rate of \$1.76 from the Valley furnaces, a western Pennsylvania steel company has a

Sheets, Nails and Wire,	Feb. 21,	Feb. 15,	Jan. 25,	Feb. 23,
	1927	1927	1927	1926
Per Lb. to Large Buyers:				
Sheets, black, No. 24, P'gh	2.75	2.80	2.85	3.10
Sheets, black, No. 24, Chicago dist. mill	2.90	2.90	3.10	3.30
Sheets, galv., No. 24, P'gh	3.65	3.70	3.75	4.05
Sheets, galv., No. 24, Chicago dist. mill	3.85	3.85	3.95	4.25
Sheets, blue, 9 & 10, P'gh	2.20	2.20	2.30	2.50
Sheets, blue, 9 & 10, Chicago dist. mill	2.30	2.30	2.40	2.60
Wire nails, Pittsburgh	2.55	2.55	2.60	2.65
Wire nails, Chicago dist. mill	2.60	2.60	2.65	2.70
Plain wire, Pittsburgh	2.40	2.40	2.45	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.50	2.55
Barbed wire, galv., P'gh	3.25	3.30	3.35	3.35
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.35	3.40
Tin plate, 100 lb. Box, P'gh	\$6.50	\$6.50	\$6.50	\$6.50

### Old Material, Per Gross Ton:

Old Material, Per Gross Ton:	Carwheels, Chicago	15.00	15.00	15.50	17.00
	Carwheels, Philadelphia	16.00	16.00	16.75	17.50
Heavy melting steel, P'gh	16.00	16.00	16.75	17.00	
Heavy melting steel, Phila.	14.50	14.50	15.00	15.50	
Heavy melting steel, Ch'go	12.75	12.75	13.50	13.75	
No. 1 cast, Pittsburgh	15.75	15.75	16.00	17.00	
No. 1 cast, Philadelphia	17.00	17.00	17.00	17.50	
No. 1 cast, Ch'go (net ton)	16.50	16.50	16.50	17.00	
No. 1 RR. wrot. Phila.	17.00	17.00	17.00	17.50	
No. 1 RR. wrot. Ch'go (net)	12.00	11.75	12.75	12.75	

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt	\$3.50	\$3.50	\$3.25	\$3.75
Foundry coke, prompt	4.50	4.25	4.50	4.75

### Metals,

Metals:	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.12 1/2	13.00	13.37 1/2	14.50	
Electrolytic copper, refinery	12.75	12.75	13.00	14.00	
Zinc, St. Louis	6.85	6.67 1/2	6.40	7.75	
Zinc, New York	7.20	7.02 1/2	6.75	8.10	
Lead, St. Louis	7.30	7.30	7.30	8.92 1/2	
Lead, New York	7.40	7.40	7.50	9.15	
Tin (Straits), New York	70.25	68.75	65.25	64.75	
Antimony (Asiatic), N. Y.	14.25	14.50	14.50	21.00	

rate of \$1.39 and a Pittsburgh merchant furnace can ship at \$1.01. Most sales of foundry iron are in single carloads, and the usual price is \$18.50, Valley furnace, for No. 2 grade. Users of Bessemer iron appear to be well covered for the present and there is not much interest in basic grade.

We quote f.o.b. Valley furnace, the freight for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	18.00
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	18.50
Low phosphorus, copper free	28.00

**Semi-Finished Steel.**—Sales of billets and slabs, aggregating approximately 5000 tons, are noted at from \$33 to \$33.50, f.o.b. Pittsburgh, and the market is clearly quotable at that range, since there is a heavier inquiry than there was recently and producers are not so eager for orders. As a general rule, makers still want \$1 per ton more for small billets and slabs than for 4-in. and larger, but there are cases where the premium is only 50c. per ton and others where large and small sizes are bunched at one price. Sheet bars are readily available at \$34, Pittsburgh and Youngstown. Forging quality billets hold at recent prices, and the open market price on wire rods is still \$43, base Pittsburgh or Cleveland.

**Plates.**—The ordinary tonnage price is 1.90c., base Pittsburgh, and lower prices refer only to large tonnages. Large business in line pipe has been helpful to plate mill operations. Besides the large-diameter pipe already booked, there is in sight approximately 200,000 tons more.

**Wire Products.**—In this district some low resale prices on nails, which were making for an unsettled mill market, have disappeared, and the market now is squarely quotable at the schedule recently announced. Within the Pittsburgh district and in the areas surrounding other producing centers, there is a measure of steadiness, which however, is lacking in consuming districts that more than one producing center can reach. Business is better than it was at the outset of the year, but all makers could stand more.

**Rails and Track Supplies.**—No fault is found over the way standard-section rails are moving on contracts, but in accessories there is still room for improvement. Light rails are selling fairly well. Prices of these lines are unchanged.

**Sheets.**—Business is steadily expanding, with notably large orders coming from the automotive industry, which taken as a whole is reasonably busy and looking for even better things next month and in April. More tonnage also is being placed by the railroad car builders and the agricultural implement manufacturers. Prices, however, remain irregular and easy. On galvanized sheets, 3.65c., base Pittsburgh, is even more common than it has been, but producers quoting \$4 a ton higher still report business at that figure. Generally, however, 3.75c., base, is the maximum. Sheet business has not responded as much as some other

lines to the low prices, and it is difficult to stabilize prices so long as there are some mills that need orders.

**Tin Plate.**—New business is light, as it usually is at this time of year, but there is so much contract business, with which all except one or two makers are well supplied, that there has been no let-down in the activity of this branch of the industry. The American Sheet & Tin Plate Co. is still close to physically full operations, and the independent average is nearly 90 per cent.

**Hot-Rolled Flats.**—Several makers are taking a stronger stand on prices, and announcement has been made by one of prices of 2.30c., base, for stock under 6 in. wide and of 2.10c., base, on material 6 in. wide and wider. These prices become effective immediately but do not affect orders already booked, some of which were taken as low as 1.90c., base, for wide stock, and 2.10c. has not been entirely exceptional on narrow strips, especially on lots that embraced both wide and narrow sizes. On cooperage quality hoops, cut to length, the ordinary quotation is 2.40c., net, Pittsburgh.

**Cold-Rolled Strips.**—The market in this product is still unsettled and weak, with 2.80c., base Pittsburgh, the large lot price and 3c. the basis of the every-day small-lot tonnage.

**Bolts, Nuts and Rivets.**—The market in bolts and nuts is more notable for its firmness than its activity. Rivets are moving well enough, but the competition for orders continues and prices favor buyers.

**Ferroalloys.**—A very tight spot delivery situation exists in spiegeleisen, as specifications against contracts are fully up to, if not in excess of, the regular monthly quotas, leaving no tonnage to speak of for current requirements. Orders for early delivery are either being refused or entered with the understanding that they will be filled only if supplies become available through failure of contract buyers to specify fully. There is a steady movement of ferromanganese and 50 per cent ferrosilicon on contracts, but not much new business. Prices are unchanged.

**Steel and Iron Bars.**—Bar mill operations are heavier in this district than they have been since last October, but in spite of the quickening of demand which that denotes, makers find it difficult to accumulate backlog. The demand is active but entirely for early delivery, and speeding up of production is necessary to meet the requirements. In a general way, orders and shipments are running very even, and delivery promises more extended than a week or 10 days apply on few sizes and to few manufacturers. Single carloads still can be placed at 1.90c., base Pittsburgh. Iron bars are moving fairly well at unchanged prices.

**Structural Steel.**—The outlook for both the mills and the fabricating shops has been improved by the appearance on the market of some good-sized local projects, notably, a 1000-room extension to the William Penn Hotel, which is expected to require from 5000 to 6000 tons. The formal request for bids on this job has not yet been issued, but after many false starts it now looks as though this addition would go ahead. Local mills are fairly well supplied with plain material business, mostly on jobs outside the Pittsburgh dis-

### THE IRON AGE Composite Prices

#### Finished Steel

Feb. 21, 1927, 2.367c. Per Lb.

One week ago	2.374c.
One month ago	2.396c.
One year ago	2.424c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

High	Low
1927 2.453c.	Jan. 4: 2.367c.
1926 2.453c.	Jan. 5: 2.403c.
1925 2.560c.	Jan. 6: 2.396c.
1924 2.789c.	Jan. 15: 2.460c.
1923 2.824c.	April 24: 2.446c.
	Feb. 21
	May 18
	Aug. 18
	Oct. 14
	Jan. 2

#### Pig Iron

Feb. 21, 1927, \$18.96 Per Gross Ton

One week ago	\$18.96
One month ago	19.30
One year ago	21.71
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High	Low
1927 \$19.71,	Jan. 4: \$18.96,
1926 21.54,	Jan. 5: 19.46,
1925 22.50,	Jan. 13: 18.96,
1924 22.88,	Feb. 26: 19.21,
1923 30.86,	March 20: 20.77,
	Feb. 15
	July 13
	July 7
	Nov. 3
	Nov. 20

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

### Soft Steel

#### Base Per Lb.

F.o.b. Pittsburgh mills	1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
De'l Philadelphia	2.22c.
De'l New York	2.24c.
De'l Cleveland	2.00c.
F.o.b. Cleveland, sizes up to 1-in. rounds,	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Cif. Pacific ports	2.85c.
F.o.b. San Francisco mills	2.85c. to 2.40c.

### Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c.
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### Rail Steel

F.o.b. mill	1.70c. to 1.80c.
F.o.b. Chicago	1.90c. to 2.00c.

### Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. Pgh mills	2.90c. to 3.00c.
Common iron, de'l Philadelphia	2.12c. to 2.22c.
Common iron, de'l New York	2.14c. to 2.24c.

### Tank Plates

#### Base Per Lb.

F.o.b. Pittsburgh mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
De'l Cleveland	2.09c.
De'l Philadelphia	2.12c. to 2.22c.
De'l New York	2.14c. to 2.24c.
Cif. Pacific ports	2.25c. to 2.30c.

### Structural Shapes

#### Base Per Lb.

F.o.b. Pittsburgh mills	1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
De'l Cleveland	2.09c.
De'l Philadelphia	2.12c. to 2.22c.
De'l New York	2.14c. to 2.24c.
Cif. Pacific ports	2.25c. to 2.30c.

### Hot-Rolled Flats (Hoops, Bands and Strips)

#### Base Per Lb.

All gages, narrower than 6 in., Pgh.	2.20c. to 2.30c.
All gages, 6 in. and wider, Pgh.	1.90c. to 2.10c.
All gages, narrower than 6 in., Chicago	2.50c.
All gages, 6 in. and wider, Chicago	2.84c. to 2.40c.

### Cold-Finished Steel

#### Base Per Lb.

Bars, f.o.b. Pittsburgh mills	2.30c. to 2.40c.
Bars, f.o.b. Chicago	2.40c.
Bars, Cleveland	2.46c.
Shafting, ground, f.o.b. mill	*2.56c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	2.80c. to 3.00c.
Strips, f.o.b. Cleveland mills	2.85c. to 3.00c.
Strips, delivered Chicago	3.18c. to 3.80c.

\*According to size.

### Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

#### Base Per Keg

Wire nails	.82.55
Galv'd nails, 1-in. and longer	4.55
Galv'd nails, shorter than 1-in	4.80
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

#### Base Per 100 Lb.

Bright plain wire, No. 9 gage	.82.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.25
Barbed wire, painted	3.00

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

### Woven Wire Fence

#### Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

## Sheets

### Blue Annealed

#### Base Per Lb.

Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.25c.
Nos. 9 and 10, f.o.b. Ohio mill	2.10c. to 2.30c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.30c. to 2.35c.
Nos. 9 and 10, f.o.b. Philadelphia	2.47c. to 2.62c.
Nos. 9 and 10, f.o.b. Birmingham	2.40c. to 2.50c.

### Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.80c. to 2.90c.
No. 24, f.o.b. Ohio mill	2.80c. to 2.90c.
No. 24, f.o.b. Ch'go dist. mill	2.90c. to 3.00c.
No. 24, f.o.b. Philadelphia	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham	3.05c. to 3.15c.

### Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.95c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.80c. to 3.90c.

### Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.80c.
No. 24, f.o.b. Ohio mill	3.70c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c. to 3.95c.
No. 24, f.o.b. Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.95c. to 4.05c.

### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill	3.10c. to 3.20c.

### Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.
No. 24, f.o.b. Birmingham	4.30c.

### Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.80c.
No. 24, 12-lb. coating, f.o.b. mill	5.20c.

### Tin Plate

#### Per Base Box

Standard cokes, f.o.b. Pgh district mills	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

### Terne Plate

#### (F.o.b. Morgantown or Pittsburgh)

#### (Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	20-lb. coating I.C. \$16.20
8-lb. coating I.C. 11.70	25-lb. coating I.C. 17.90
15-lb. coating I.C. 14.85	30-lb. coating I.C. 21.65
20-lb. coating I.C. 19.45	40-lb. coating I.C. 21.65

### Alloy Steel Bars

#### (F.o.b. Pittsburgh or Chicago)

S. A. E. Series	Base Per 100 Lb.
2100* (1/4% Nickel, 0.10% to 0.20% Carbon)	\$8.00 to \$15.15

2300 (3/4% Nickel)	4.80 to 4.40
2500 (5% Nickel)	5.50

3100 (Nickel Chromium)	8.30 to 3.40
3200 (Nickel Chromium)	4.75 to 5.00

3300 (Nickel Chromium)	7.00 to 7.25
3400 (Nickel Chromium)	6.25 to 6.50

5100 (Chromium Steel)	8.30 to 3.40
5200* (Chromium Steel)	7.00 to 7.50

6100 (Chrom. Vanadium bars)	4.20 to 4.50
6100 (Chrom. Vanad. spring steel)	8.80

9250 (Silicon Manganese spring steel)	3.20 to 3.20
Carbon, 0.45% to 0.55% Vanad.	4.10 to 4.20

Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.20 to 4.30
Chromium Molybdenum bars (0.80-1.10 Chrom., 0.25-0.40 Molyb.)	4.25 to 4.35

trict. Local fabricating shops are not running at more than 60 per cent of capacity. The ordinary tonnage price of plain material remains at 1.90c., base Pittsburgh.

**Tubular Goods.**—The situation is featured by a continued active demand for line pipe. A subsidiary of the Standard Oil Co. of New Jersey recently distributed 65 miles of 18-in. plain-end pipe for a gas line to run from Baton Rouge to New Orleans dividing the order among two Pittsburgh mills and one Youngstown maker. The Petroleum Exploration Co. is in the market for 78 miles of 8½-in. pipe, and the Pure Oil Co. wants 60 miles of 6½-in. pipe for Oklahoma. The Texas Corporation inquiry for 410 miles of 20 and 22-in. pipe is for a line to run from Monroe, La., to Port Arthur, Tex. Almost all makers have shared in the line pipe business that has developed since the first of the year, and there is now a considerable backlog of such business and more in sight. As it runs to the large sizes, which move through the mills slowly, it may later be hard for the makers to promise prompt deliveries on welded casing and other oil and gas well pipe, when the demand expands as it is expected to in the next 60 to 90 days. There is not much danger of a shortage, however, as most makers have been stocking in the past few months and there is the seamless capacity to draw upon. A good business for this time of year is being done in oil and gas well pipe, but standard-weight pipe still waits on heavy building construction activities. Mechanical tubes are moving well. The boiler tube market still reflects the fact that sellers are more numerous than buyers. Discounts are given on page 599.

**Cold-Finished Steel Bars and Shafting.**—Reports as to prices are conflicting. Most makers insist that 2.40c., base Pittsburgh, is the minimum price on ordinary everyday business, but against that are sales of comparatively small lots at 2.30c. The latter price must be recognized as part of the market, since the general demand, while much better than it was last month or in December, is not filling up mill schedules to a point where one maker can afford the loss of a customer to another. Orders and shipments are running along very evenly, and few makers can schedule more than a week or 10 days ahead.

**Coal and Coke.**—The coke market is firm, as there seems to be no excess of production over current contract requirements and a demand for non-metallurgical purposes appears to be absorbing any surplus there is of furnace grade. Spot furnace coke is no longer quotable under \$3.50 per net ton at ovens, and \$3.75 is being asked. Spot foundry coke is now quotable at \$4.50 to \$5 per net ton at ovens for good brands. There is something of a stocking movement in foundry coke and not much increase in the output to meet it. Coal is selling well enough, but there is too much available for prices to strengthen.

**Old Material.**—Dealers with uncovered orders for heavy melting steel have lately shown some anxiety to fill them, and the market is stronger because of that demand. Bids of less than \$16 for this grade

#### Warehouse Prices, f.o.b. Pittsburgh

Base per Lb.

Tank plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Spikes, large	3.30c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Bolts, track	4.90c.
Wire, black soft annealed, base per 100 lb.	32.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	2.90
Cement coated nails, per keg	2.90

have brought out very little tonnage, and in a general way \$16 is as low as has been done, while \$16.25 has been paid by dealers who wanted to be sure of delivery before the expiration of the contracts. The market is stronger on machine shop turnings and on blast furnace grades. One sale of 1000 tons of the former is noted at \$11.50, and \$12 is commonly asked. Blast furnace grades have not sold below \$12.50 in the past week.

We quote for delivery to consumers' yards in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton
Heavy melting steel..... \$16.00 to \$16.25
Scrap rails..... 15.50
No. 1 cast, cupola size..... 16.00
Compressed sheet steel..... 15.00
Bundled sheets, sides and ends..... 14.00
Railroad knuckles and couplers..... 18.00 to 18.50
Railroad coil and leaf springs..... 18.00 to 18.50
Low phosphorus blooms and billet ends..... 20.00 to 20.50
Low phosphorus mill plates..... 19.50 to 20.00
Low phosphorus, light grade..... 17.50 to 18.00
Low phosphorus punchings..... 18.00 to 18.50
Steel car axles..... 21.00 to 21.50
Cast iron wheels..... 16.00 to 16.50
Rolled steel wheels..... 18.00 to 18.50
Machine shop turnings..... 11.50 to 12.00
Short shoveling steel turnings..... 12.50 to 12.75
Sheet bar crops..... 17.50 to 18.00
Heavy steel axle turnings..... 14.50 to 15.00
Short mixed borings and turnings..... 12.50 to 12.75
Heavy breakable cast..... 14.25 to 14.75
Cast iron borings..... 12.50 to 12.75
No. 1 railroad wrought..... 12.00 to 12.50
No. 2 railroad wrought..... 16.00 to 16.25
Railroad or automobile malleable scrap..... 16.00 to 16.50

#### Industrial Finances

The Truscon Steel Co. Youngstown, reports net income for 1926 after all charges and taxes of \$2,521,963, equivalent after preferred dividends to \$3.81 a share on the 474,932 shares of common stock outstanding, and compared with \$2,293,165, or \$3.55 a share in 1925. Gross sales for the year amounted to \$31,563,073, compared with \$27,658,690 in 1925. Net current assets as of Dec. 31 were \$6,605,635, compared with \$5,581,236 at the end of the preceding year, and surplus was increased by 1926 earnings to \$4,538,592.

Net profit of the Baldwin Locomotive Works, Philadelphia, for the year ended Dec. 31, 1926, after expenses, interest, Federal taxes, etc., amounted to \$5,883,906, equivalent after preferred dividends to \$22.41 a share on the \$20,000,000 common stock. This compares with \$196,564 or 98c. a share in 1925.

Net operating profits of the Harbison-Walker Refractories Co., Pittsburgh, for the year ended Dec. 31 last, were \$3,999,378, leaving a surplus after preferred and common stock dividends of \$1,054,638. The total surplus as of Dec. 31 was \$4,820,379.

The Elyria Iron & Steel Co., Cleveland, reports that its business during the year ending Dec. 31, 1926, increased 30 per cent over 1925. Net earnings available for dividends after all charges amounted to \$432,000. After paying preferred dividends there remained \$6.76 a share for the 6000 shares of common stock, on which dividends are being paid at the rate of \$3 per year. A stock dividend of 10 per cent was declared. During the year the company acquired the Standard Steel Tube Co., Toledo, and the Superior Metal Products Co., Elyria, Ohio.

The Lake Erie Bolt & Nut Co., Cleveland, reports net income in 1926 of \$167,551 after allowing \$60,434 for depreciation. After dividends \$152,551 was transferred to the surplus. The earnings were \$2.54 on 60,000 shares of common stock, as compared with \$2.20 in 1925.

Net income for 1926 of the J. I. Case Threshing Machine Co. after all charges, taxes and special appropriation of \$300,000 to reserve for contingencies, was \$3,517,429, compared with \$2,293,673 for 1925, and equal after preferred dividends to \$21 a share on the common stock outstanding, compared with \$11.45 a share in 1925. During the year the company purchased in the open market 10,000 shares of preferred stock of a par value of \$1,000,000. Current assets and liabilities as of Dec. 31, 1926, were \$21,284,289 and \$2,315,672, respectively, against \$19,100,890 and \$2,603,462 at the end of 1925.

The Miller Scrap Iron Co., Green Bay, Wis., has filed a voluntary petition in bankruptcy, scheduling liabilities of \$92,003 and assets of \$60,371.

The Calumet & Hecla Consolidated Copper Co. shows a net profit for 1926 of \$1,500,318, comparing with deficits of \$436,676 in 1925, and \$1,634,488 in 1924.

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel F.o.b. Pittsburgh or Youngstown

### Billets and Blooms

	Per Gross Ton
Berolling, 4-in. and over	\$33.00 to \$33.50
Berolling, under 4-in. to and including 1½-in.	34.00 to 34.50
Forging, ordinary	40.00
Forging, guaranteed	45.00

### Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	\$36.00

### Slabs

	Per Gross Ton
8 in. x 2 in. and larger	\$33.00 to \$33.50
Smaller than 8 in. x 2 in.	34.00 to 34.50

### Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

### Wire Rods

	Per Gross Ton
Common soft, base	\$43.00
Screw stock	\$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

\*Chicago mill base is \$44. Cleveland mill base, \$43.

## Prices of Raw Materials

### Ores

#### Lake Superior Ores, Delivered Lower Lake Ports

#### Per Gross Ton

Old range Bessemer, 51.50% iron	\$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	

#### Per Unit

Iron ore, low phos., copper free, 55 to 58%	10.00c. to 10.50c.
Iron ore, Swedish, average 66% iron, 9.50c. to 10.00c.	

Manganese ore, washed, 52% manganese, from the Caucasus	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.

Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$18.50
Per Ton	

Chrome ore, Indian basic, 48% Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic seaboard	\$22.50
Per Lb.	

Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered	50c. to 55c.
Per Lb.	

### Coke

#### Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$3.50 to \$3.75
Foundry, f.o.b. Connellsville prompt	4.50 to 5.00

Foundry, by-product, Ch'g' ovens	9.75
Foundry, by-product, New England, del'd	12.50

Foundry, by-product, Newark or Jersey City, delivered	9.50 to 10.77
Foundry, Birmingham	5.50 to 6.00

Foundry, by-product, St. Louis	10.50
Per Net Ton	

### Coal

#### Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.75 to \$1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.85 to 2.00

Mine run gas coal, f.o.b. W. Pa. mines	1.90 to 2.10
Steam slack, f.o.b. W. Pa. mines	1.25 to 1.35

Gas slack, f.o.b. W. Pa. mines	1.40 to 1.50
Per Net Ton	

### Ferromanganese

#### Per Gross Ton

Domestic, 80%, furnace or seab'd	\$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

### Spiegeleisen

#### Per Gross Ton Furnace

Domestic, 19 to 21%	\$37.00
Domestic, 16 to 19%	36.00

### Electric Ferrosilicon

#### Per Gross Ton Delivered

50%	\$85.00
75%	145.00

Per Gross Ton Furnace	Per Gross Ton Furnace
10%	\$35.00 12%
11%	37.00 14 to 16% \$45 to 48.00

### Bessemer Ferrosilicon

#### F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
10%	\$54.00 12%
11%	66.00

### Silvery Iron

#### F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6%	\$26.50 10%
7%	27.50 11%
8%	28.50 12%
9%	30.00

### Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd

\$1.06 to \$1.10

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr, delivered, in carloads

\$11.50c.

Ferrovanadium, per lb. contained vanadium, f.o.b. furnace

\$32.25 to \$40.00

Ferrocobaltium, 15 to 18%, per net ton, f.o.b. furnace, in carloads

\$200.00

Ferrophosphorus, electric or blast furnace material, in carloads, 15% Rockdale

Tenn., base, per net ton

\$81.00

Ferrophosphorus, electric, 24%, f.o.b. Alniston, Ala., per net ton

\$122.50

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

### Bolts and Nuts

#### (Less-than-Carload Lots)

#### (F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

#### Per Cent Off List

Machine bolts, small, rolled threads	50c. to 10c.
Machine bolts, all sizes, cut threads	50c. to 10c.

Carriage bolts, smaller and shorter, rolled threads	50c. to 10c.
Carriage bolts, cut threads, all sizes	50c. to 10c.

Eagle carriage bolts	50c. to 10c.
Lag bolts	50c. to 10c.

Flow bolts, Nos. 3 and 7 heads	50c. to 10c.
(Extra of 20% for other style heads)	

Machine bolts, c.p.c. and t. nuts, 5/8" x 4 in.	45c. to 10c.
Larger and longer sizes	45c. to 10c.

Bolt ends with hot-pressed nuts	50c. to 10c.
Bolt ends with cold-pressed nuts	50c. to 10c.

Hot-pressed nuts, blank or tapped, hexagon	4.40c. per lb. off list
Hot-pressed nuts, blank or tapped, square or hex. nuts, blank or tapped	4.10c. per lb. off list

C.p.c. and t. square or hex. nuts, blank or tapped	4.10c. per lb. off list
Washers	6.75c. to 6.90c. per lb. off list

\*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots. On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

### Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

#### Per Cent Off List

Semi-finished hexagon nuts	
5/8" in. and smaller, U. S. S.	50c. to 1

## Chicago

### Another Furnace Blown In at Gary— Heavy Melting Steel Declines

CHICAGO, Feb. 21.—Buying of steel is a trifle lighter than at the middle of the month, but it is still close to the average for last year. Car builders, having ordered out tonnage required to start recent contracts, are sending in lighter specifications, and inasmuch as they are the largest users of steel at the moment, specifications on the whole are smaller than a week ago. Demand for steel products in general has been on an upward trend since shortly after the first of the year, and the situation has been met by increased mill operations, so that deliveries have not been extended. Consumers' orders for plates, shapes and bars are being filled in two to four weeks. Shipments are 5 per cent heavier than last week.

The Steel Corporation has blown in another blast furnace at Gary, giving it 11 active stacks at that plant, in addition to seven at South Chicago and one at Joliet. Production of steel works pig iron has not been keeping pace with shipments of finished steel products, with the result that stocks of pig iron on the ground have been slowly but steadily diminishing.

Structural awards are light, but owing to the fact that fabricators are inclined to put in small stocks, specifications for plain material are generally considered fair. Structural shops are not heavily engaged, some of the smaller ones being down to 25 per cent of capacity operations. Fabricators having plant facilities for handling large contracts are about 70 per cent engaged, and at that rate have books that provide for about two and one-half months of work.

Sales of heavy melting steel have been made at 25c. below previous quotations, and there is evidence of a further weakening in the price of that grade. Late in the week more extensive trading developed in cast iron borings, a grade which has been relatively scarce, due to curtailed operations of machine shops during the winter months. The increased supply is tending to bear the price downward.

**Pig Iron.**—The Chicago market is steady, with sales reported at \$20 to \$20.50 f.o.b. local furnace. Two sales of 500 tons each of foundry iron and three orders for malleable in lots of 300 to 600 tons have been placed in and near Chicago for delivery during the remainder of February and March. A user at Minneapolis is asking for 2000 tons of foundry iron for delivery during the second and third quarters. On the whole, shipments are unchanged from a week ago. The silvery market is quiet, and six carloads offered for resale several days ago have not been placed. A user close to Chicago is inquiring for 300 to 500 tons of low phosphorus iron for delivery during March and April. Charcoal iron is quiet, and the price is steady at \$27.04, delivered.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sll. 1.75 to 2.25	\$20.00 to \$20.50
Northern No. 1 foundry, sll. 2.25 to 2.75	20.50 to 21.00
Malleable, not over 2.25 sll.	20.00 to 20.50
High phosphorus	20.00 to 20.50
Lake Superior charcoal, averaging sll. 1.50, delivered at Chicago	27.04
Southern No. 2 (all rail)	24.01
Southern No. 2 (barge and rail)	22.18
Low phos., sll. 1 to 2 per cent, copper free	31.50 to 32.50
Silvery, sll. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

**Ferroalloys.**—With the exception of specifications for ferromanganese and ferrosilicon, this market is quiet. In spiegelisen the domestic producer is reported to be sold for the remainder of the first half, and transactions in this district are confined to carlot sales of the foreign product at the full schedule. A charcoal furnace at Delta, Mich., recently experimented in mak-

ing spiegelisen and reports indicate that it will produce that commodity on a commercial basis.

We quote 80 per cent ferromanganese, \$107.56, delivered Chicago; 50 per cent ferrosilicon, \$85, delivered; spiegelisen, 18 to 22 per cent, \$44.56, delivered Chicago.

**Plates.**—Specifications for average-width plates are well maintained. Reports from the oil fields of the Southwest indicate that several large tankage projects are well under way. The bulk of the plates now being rolled is for car builders and building construction. Schedules are well arranged, and although some mills are booked well in advance, deliveries of two to four weeks are being promised. Fresh inquiries and orders for cars are dragging, but Western car builders are now scheduled well into May. There is little or no change in the price situation, sales being reported at 2c. to 2.10c., Chicago.

The mill quotation on plates is 2c. to 2.10c. per lb. base, Chicago.

**Structural Material.**—Inquiry before the trade is of large proportions, but fabricating contracts are slow in being signed. Large-tonnage awards made in the fall and early winter gave the large shops good backlog, and operations are well maintained. The smaller fabricators have not fared so well. Competition is keen, and current bids are low as shown by a recent quotation of \$65.50, delivered, for a tonnage to be erected near St. Louis. Specifications for plain material are in fair volume considering the time of year. Quotations on shapes are steady at 2c. to 2.10c., Chicago.

The mill quotation on plain material is 2c. to 2.10c. per lb. base, Chicago.

**Bars.**—Specifications for soft steel bars are equal to those of a week ago, when they reached the peak in almost a year. Sales are in good volume and are keeping pace with shipments. Mill schedules are well arranged, being the best in over a month, and delivery is being promised in two to four weeks. Demand is widespread, coming from all classes of users, although it is noticeable that forgers are taking large quantities while reinforcing bar warehouses are forwarding light specifications. Mild steel bars are steady at 2c. to 2.10c., Chicago. The demand for iron bars is small, and mills are operating on a hand-to-mouth basis. Few contracts were made for the first quarter, and specifications against them have been unusually light. The price of iron bars is unchanged at 2c., Chicago. In rail steel bars new business from the manufacturing trade shows no improvement, although specifications are somewhat heavier. Orders for fence posts are in greater volume, and shipments have taken a sharp upturn as compared with a week ago. Contracts for rail steel reinforcing bars are not numerous, and bending shops are not more than 40 per cent engaged. Chicago Heights producers are operating on a reduced-hour, double-turn basis, and mill stocks are accumulating. Rail steel bar prices are steady at 1.90c. to 2c., Chicago.

The prices per lb. are: Mild steel bars, 2c. to 2.10c. base, Chicago; common bar iron, 2c. base, Chicago; rail steel bars, 1.90c. to 2c. base, Chicago.

**Rails and Track Supplies.**—Purchases of track accessories by Western railroads total 7000 tons. Inquiry is light at the moment, but there is still a round tonnage to be bought in this market. Production is at 65 per cent of capacity. Several miscellaneous lots of standard-section rails, totaling 5000 tons, have been purchased. Production schedules are well arranged, and no changes are reported except on the tonnage for the Illinois Central, which has reduced its specifications somewhat to bring them more in line with the average shipping orders of the past few years. The light rail market is quiet, sales being of carlot proportions.

Standard Bessemer and open-hearth rails, 343; light rails, rolled from billets, \$36 to \$38 per gross ton, f.o.b. maker's mill.

Standard railroad spikes, 2.90c. per lb. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.35c. mill; angle bars, 2.75c. mill.

**Wire Products.**—A further increase in demand is

noted. Specifications from the manufacturing trade show improvement, and jobbers, particularly in the Central West and South, are ordering out larger quantities. Business in the Northwest is developing slowly, and reports indicate that the outlook is promising in that part of the country. Stocks in the hands of jobbers are light, and as spring approaches there is a tendency for some buyers to ask for larger shipments in order that they may be better prepared for the spring demand. Producers have been hesitant to step up production, with the result that the increased demand of the last week or two has cut down mill stocks. Bright plain wire is steady at \$2.45, delivered, Chicago, but nails are being shaded by wholesalers, the concessions ranging from \$1 to \$2 a ton. Prices of wire products are shown on page 599.

**Reinforcing Bars.**—New awards of reinforcing bars are few in number. Open winter weather has been favorable to construction, with the result that shipments on old contracts have been in good volume and shops, lacking new bookings, have reduced operations to about 40 per cent of capacity. Outstanding tonnage is large, and dealers are at a loss to explain why more business is not being taken. One factor which may have a bearing on this is that competition in mid-winter was keen and prices were often shaded. Of late there has been a better stand for prices, and it is evident that buyers are not wholly satisfied that present quotations will hold. The bids for the Cook County, Ill., jail addition, Chicago, requiring 600 tons, are now before the County Board. A fresh inquiry of note is 450 tons for the superstructure of the Chatelaine Towers apartment building, Chicago. The Chicago board of education is planning nine schools, each to cost about \$500,000. Quotations for billet steel reinforcing bars are steady at 2.30c. to 2.75c., Chicago warehouse, and hard steel reinforcing bars are quoted, at 2.10c. to 2.55c., Chicago.

**Sheets.**—Orders and specifications are a trifle heavier than a week ago, but prices show little, if any, tendency to stiffen. Shipments are running ahead of the daily average for January. Although deliveries are wholly satisfactory, ranging from 10 days to four weeks depending on the character of the specifications and the grade, buyers are looking further ahead and fully 50 per cent of new orders are for future requirements. Competition from makers not in the Chicago district is still keen, but not so pronounced as a week ago. The Inland Steel Co. will have its new sheet bar mill in operation in the next three or four days.

Chicago delivered prices from mill at 2.95c. to 3.05c. for No. 24 black; 2.35c. to 2.40c. for No. 10 blue annealed; 3.90c. to 4c. for No. 24 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

**Bolts, Nuts and Rivets.**—Specifications are somewhat heavier, and there is a noticeable pick-up in spot buying by users who do not cover by contract. The

#### Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Mild steel bars.....	3.00c.
Reinforcing bars, billet steel.....	2.30c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Hoops.....	4.15c.
Bands.....	3.65c.
No. 24 black sheets.....	3.05c. to 3.15c.
No. 10 blue annealed sheets.....	2.40c. to 2.45c.
No. 24 galvanized sheets.....	3.90c. to 4.00c.
Standard railroad spikes.....	3.55c.
Track bolts.....	4.55c.
Structural rivets.....	3.50c.
Boiler rivets.....	3.70c.
	Per Cent Off List
Machine bolts.....	50 and 5
Carriage bolts.....	47 1/2
Coach or lag screws.....	55 and 5
Hot-pressed nuts, squares, tapped or blank, 3.25c. off per lb.	
Hot-pressed nuts, hexagons, tapped or blank, 3.75c. off per lb.	
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	2.05
Cement coated nails, base per keg.....	3.05

bolt, nut and rivet industry is engaged at 60 to 65 per cent capacity. Reports indicate that the proposed revision of bolt and nut discounts is rapidly taking form and it is possible that contracts written for the second quarter will be based on the new schedule.

**Old Material.**—Heavy melting steel has declined 25c. a ton on a consumer's purchase of about 5000 tons. The top of the market on this grade is now \$13.25 per gross ton, delivered, and dealers are trading at \$13. Several weeks ago when prices were showing some degree of strength, mills let down the bars on inspection and accepted shipments of heavy melting that were off-grade. With lower prices and a free flow of scrap, standards have been raised again and rejections have been numerous this week. Manufacturers' scrap is not coming out rapidly, and dealers are having trouble in covering on such items as cast iron borings. Railroad shipments are coming on track freely and promptly, and in a market as quiet as the present one, dealers are being forced to trade or sell to users at lower price levels. The weakness of the market is leading to more cautious bidding on railroad lists, and prices paid are much closer to market quotations than has been the case for many months. On lists recently closed the Santa Fe got \$13.66 per gross ton, delivered, for heavy melting steel, \$16.60 for coil springs, \$14.80 for steel angle bars and \$16.15 for malleable. The Rock Island received \$13 per net ton, delivered, for grate bars. The Burlington is advertising 5900 tons, and the Chicago Great Western, 1000 tons.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items, except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

#### Per Gross Ton

Heavy melting steel.....	\$12.75 to \$13.25
Frogs, switches and guards, cut apart, and miscellaneous rails.....	14.25 to 14.75
Shoveling steel.....	12.75 to 13.25
Hydraulic compressed sheets.....	11.50 to 12.00
Drop forge flashings.....	9.50 to 10.00
Forged cast and rolled steel car-wheels.....	16.25 to 16.75
Railroad tires, charging box size.....	17.00 to 17.50
Railroad leaf springs, cut apart.....	16.25 to 16.75
Steel couplers and knuckles.....	15.50 to 16.00
Coil springs.....	16.50 to 17.00
Low phosphorus punchings.....	15.50 to 16.00
Axle turnings, foundry grade.....	13.00 to 13.50
Axle turnings, blast fur. grade.....	10.00 to 10.50
Relaying rails, 56 to 60 lb.....	25.50 to 26.50
Relaying rails, 65 lb. and heavier.....	26.00 to 31.00
Reroiling rails.....	15.50 to 16.00
Steel rails, less than 3 ft.....	16.50 to 17.00
Iron rails.....	13.50 to 14.00
Cast iron borings.....	10.00 to 10.50
Short shoveling turnings.....	10.00 to 10.50
Machine shop turnings.....	7.00 to 7.50
Railroad malleable.....	16.00 to 16.50
Agricultural malleable.....	14.75 to 15.25
Angle bars, steel.....	14.50 to 15.00
Cast iron carwheels.....	15.00 to 15.50

#### Per Net Ton

No. 1 machinery cast.....	16.50 to 17.00
No. 1 railroad cast.....	15.50 to 16.00
No. 1 agricultural cast.....	14.00 to 14.50
Stove plate.....	12.25 to 13.75
Grate bars.....	12.75 to 13.25
Brake shoes.....	12.00 to 12.50
Iron angle and splice bars.....	14.00 to 14.50
Iron arch bars and transoms.....	18.50 to 19.00
Iron car axles.....	21.50 to 22.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	11.50 to 12.00
No. 1 busheling.....	10.25 to 10.75
No. 2 busheling.....	7.00 to 7.50
Locomotive tires, smooth.....	16.00 to 16.50
Pipes and flues.....	8.00 to 8.50

**Cast Iron Pipe.**—This market is still active, and although prices are steady, there appears to be little or no tendency for them to advance. Large tonnages of 6-in. and larger pipe can still be placed at \$35.50, base Birmingham, whereas small orders for sizes on which bookings are heavy are going at \$37, base Birmingham. Pipe makers are sold for 30 to 90 working days, and delivery promises average about 45 days. Private buying has been heavy this week, the utility companies having come in with good orders. Small municipalities, being anxious to secure deliveries when needed, have also been active. Chicago has placed

(Concluded on page 615)

## New York

### Large Sales of Pig Iron at Low Prices— Volume of Steel Orders Gains

NEW YORK, Feb. 21.—The low level of pig iron prices, particularly on brands sold on a Buffalo base, has encouraged buying on a broader scale. Sales by local brokers during the week showed a gain, totaling close to 20,000 tons. In New England, the H. B. Smith Co., Westfield, Mass., alone bought from 10,000 to 15,000 tons of foundry. Some of this tonnage, for prompt delivery, was placed at a reported price of \$16.50, base Buffalo, while the remainder, for delivery through the second quarter and into the third, is understood to have gone at \$17, base Buffalo, or equivalent. The General Fire Extinguisher Co., Providence, R. I., has closed against an inquiry for 1500 to 2000 tons of foundry for second quarter. The General Electric Co., Schenectady, N. Y., which was in the market for 4580 tons for its New Jersey, New York and New England plants, has bought. It is also understood to have placed orders for its Erie, Pa., plant. The Somerville Iron Works, Somerville, N. J., has purchased about 4000 tons for second quarter. A relatively small part of this tonnage went to an eastern Pennsylvania producer, while the bulk of it was bought on a Buffalo base. Eastern Pennsylvania iron now ranges from \$20.50 to \$21, furnace, for No. 2 foundry. The Thatcher Furnace Co., Newark, N. J., has also closed for about 4000 tons. The Worthington Pump & Machinery Corporation has placed 1100 tons of foundry for its Elmwood Place, Ohio, plant, and has entered the market for 1200 tons of foundry iron for Harrison, N. J., and 310 tons for Holyoke, Mass. The Burnham Boiler Corporation, Irvington, N. Y., is inquiring for 1000 tons of foundry for its Lancaster, Pa., plant. Competition among furnaces is still keen, but as producers build up backlog they are becoming less aggressive in solicitation and, in a few instances, are letting business pass rather than meet going prices. The Donner Steel Co., Buffalo, is warming up a furnace that has been enlarged to produce about 750 tons a day. It is understood that the stack will be used mainly on merchant iron.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices, \$1.39 to \$2.52 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.54 from Virginia:

East. Pa. No. 2 fdy., sll. 1.75 to 2.25	\$22.89 to \$23.02
East. Pa. No. 2X fdy., sll. 2.25 to 2.75	22.89 to 23.52
East. Pa. No. 1X fdy., sll. 2.75 to 3.25	23.39 to 24.02
Buffalo fdy., sll. 1.75 to 2.25 (all rail)	21.91 to 22.41
No. 2 Virginia fdy., sll. 1.75 to 2.25	26.54 to 27.04

**Ferroalloys.**—Demand for both ferromanganese and spiegeleisen continues to be confined to carload and small lots and there is an absence of inquiry for large quantities. There has been no change in prices. Supplies of spiegeleisen are reported as limited. Very little is heard of material that is imported. Specifications on contract continue satisfactory.

**Finished Material.**—The last week brought little change either in volume of new business or in prices. There is evidence of effort by a number of mills to strengthen prices, particularly on plates and sheets. Plates are still quoted at 1.90c., Pittsburgh, for sizable lots and buyers are finding increasing difficulty in getting under it. Some sheet mills have established 2.20c., Pittsburgh, on blue annealed, 2.80c. on black and 3.70c. on galvanized as minimum prices. Reports of concessions of \$1 and \$2 on all these figures are current, but do not always meet substantiation upon actual testing. Bars and shapes are weak, and orders are not being received at the expected rate. However, some large producers are holding to 1.90c., Pittsburgh, on both shapes and bars. The wire market seems fairly well stabilized at the recent \$2 a ton reduction. Plain wire is quoted at \$2.40, Pittsburgh, and wire nails at \$2.55. The price cut on these products succeeded in

bringing out more business than is usual in a soft market. Hot strips have settled to 1.90c., Pittsburgh, and the width differential has practically disappeared, except below, say, 3 in. Cold-rolled strip steel is being sold at 2.80c. to 3.10c., Pittsburgh, and a ruling price would be hard to determine. Alloy steels are finding a better demand as the automotive industry improves, and attractive orders are being taken. Considered in its entirety, February business on all products is running ahead of January, and there is indication of some improvement during the next month. Bookings of fabricated structural steel in the last week have been light, but inquiries are being made on a store building in Newark and a bank and office building in New York, which will take 12,000 and 6000 tons, respectively.

We quote mill shipments, New York delivery, as follows: Soft steel bars, 2.24c. per lb.; plates, 2.14c. to 2.24c.; structural shapes, 2.14c. to 2.24c.; bar iron, 2.14c. to 2.24c.

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	5.75c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1 1/4 x 1/8 in. and larger	3.30c.
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Per Cent Off List	
Machine bolts, cut thread	40, 10 and 10
Carriage bolts, cut thread	30 and 10
Coach screws	40, 10 and 10
Boiler Tubes	Per 100 Ft.
Lap welded steel, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

### Discounts on Welded Pipe

Standard Steel—	Black	Galv.
1/2-in. butt.	46	29
5/8-in. butt.	51	37
3/4-in. butt.	58	39
2 1/2-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12

### Wrought Iron—

1/2-in. butt.	4	+19
5/8-in. butt.	11	+9
1-1 1/2-in. butt.	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16

### Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

### Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	15.75 to 14.25

### Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.00c.
No. 22	4.15c.
No. 24	4.20c.
No. 26	4.30c.
No. 28*	4.45c.
No. 30	4.70c.

### Sheets, Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.45c. to 4.70c.
No. 18	4.60c.
No. 20	4.75c.
No. 22	4.80c.
No. 24	4.95c.
No. 26	5.20c.
No. 28*	5.45c.
No. 30	5.85c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

**Reinforcing Bars.**—The Concrete Steel Co. will furnish 500 tons of bars for a telephone building at Syracuse, N. Y. No other large jobs have been reported in this territory during the week, but there is the usual amount of new inquiry. Estimated conservatively, from 5000 to 6000 tons of bars will be required on projects now being figured in the New York metropolitan district alone. Prices are unchanged.

Mill prices on billet steel reinforcing bars are: 2c. per lb. base, Pittsburgh. Reinforcing bars out of New York warehouse are quoted at 3.15c. per lb. delivered at job, and out of Youngstown warehouse at 2.50c., Youngstown, or 2.87½c., delivered New York.

**Cast Iron Pipe.**—Most makers are well booked with business in small sizes, particularly 4-in. to 6-in., but there is apparently plenty of capacity available in the larger specifications of bell and spigot pipe. Bids open Feb. 24 on the 10,000 tons of pipe and fittings for the city of New York. In calling for bids this time, the city has inserted a clause specifying pipe manufactured by American foundries, so that the previous delays in making awards, occasioned by low bids coming from a foreign maker, apparently will not be repeated. The United States Cast Iron Pipe & Foundry Co. is reported to have been the low bidder on 2000 tons of 6-in. and 8-in. pipe for a waterworks at Orchard Park, N. Y., bids on which were opened Feb. 11. Prices of water and gas pipe are firmer, but there is, as yet, no evidence of an advance.

We quote pressure pipe per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, \$48.60 to \$50.60; 4-in. and 5-in., \$53.60 to \$55.60; 3-in., \$63.60 to \$65.60; with \$5 additional for Class A and gas pipe.

**Warehouse Business.**—Although purchases from stock are still small, February business is considerably better than that of January, and buying for spring requirements is beginning to appear. Demand for structural material is slightly better, with fabricators purchasing small lots from warehouses. Black and galvanized sheets continue firm, and jobbers show no inclination to offer concessions, even on larger lots.

**Coke.**—Demand for foundry coke continues active, and prices are advancing, with foundry grade quoted at \$4.50 to \$5 per ton, Connellsville, and furnace at \$3.75 to \$4 per ton, Connellsville. The current demand is well distributed and composed of small, but numerous, purchases for spot shipment. Delivered prices of foundry coke are: To northern New Jersey, \$8.53 to \$9.53; New York or Brooklyn, \$9.29 to \$10.29; Newark or Jersey City, N. J., \$8.41 to \$9.41 per ton. By-product foundry coke is unchanged at \$9.59 to \$10.77 per net ton, delivered Newark or Jersey City, N. J.

**Old Material.**—The downward movement of prices continues, and as a further difficulty, brokers report consumers increasingly severe in their inspection. No. 1 heavy melting steel is quoted at \$14.50 to \$15 per ton, delivered eastern Pennsylvania. Borings and turnings continue an active grade. One eastern Pennsylvania consumer has closed on about 20,000 tons for two plants, and brokers are offering \$10.50 per ton, delivered. Prices of most grades are largely unchanged from last week, but the tendency toward lower levels is still strong and brokers expect further reductions in buying prices.

Buying prices per gross ton, New York, follow:

No. 1 heavy melting steel	\$11.00 to \$11.85
Heavy melting steel (yard)	8.50 to 8.75
Rails for rolling	12.00 to 12.50
Steel car axles	16.50 to 17.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	12.50 to 13.50
No. 1 yard wrought, long	11.50 to 12.50
Forge fire	8.50 to 9.00
Cast borings (steel mill)	8.25 to 8.75
Cast borings (chemical)	12.50 to 13.00
Machine shop turnings	7.75 to 8.25
Mixed borings and turnings	7.50 to 8.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.75
Stove plate (steel mill)	8.50 to 8.75
Stove plate (foundry)	10.50 to 10.75
Locomotive grate bars	9.50 to 10.00
Malleable cast (railroad)	14.00 to 14.25
Cast iron carwheels	11.00 to 11.50
No. 1 heavy breakable cast	11.75 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	\$15.00 to \$15.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	13.50 to 14.00
No. 2 cast (radiator, cast boilers, etc.)	12.50 to 13.00

## Cleveland

### Steel Demand Still Improving—53,000 Tons of Pig Iron Sold

CLEVELAND, Feb. 21.—The improved demand for finished steel in this territory reported a week ago is holding up. While much of this is due directly or indirectly to the greater activity in the automotive industry, consumers in other fields are buying somewhat more freely than a few weeks ago. Automobile manufacturers, as a rule, are purchasing for only about 30 days' requirements, and some are restricting their shipments against orders placed to avoid the accumulation of large stocks.

Outside of the demand from the automotive field, the call for sheets is still moderate, and some of the mills are unable to accumulate much of a backlog. The competition reported on plates in the Pittsburgh territory evidently has not reached this market, which has few large-lot buyers. However, the price situation has resulted in some hesitation on the part of small-lot consumers, who are testing out the market in efforts to secure prices lower than 1.90c., Pittsburgh. While some small lots of steel bars are still bringing 2c., Pittsburgh, 1.90c. applies to most of the business. The local mill price ranges from 1.90c. to 2c., Cleveland, with 1.80c. being quoted in some cases for attractive lots. The Corrigan, McKinney Steel Co. started up its 12-in. bar mill during the week and is now making a wide range of sizes. Structural material is unchanged at 1.90c., Pittsburgh.

Inquiry from the building field is rather slow. Local grade crossing elimination work which will come out shortly, will require a fair tonnage.

**Iron Ore.**—The consumption of Lake Superior ore during January amounted to 4,523,863 tons, a decrease of 38,157 tons from December. During January, 1926, the amount consumed was 5,042,792 tons. On Feb. 1 there was 33,971,030 tons of ore on hand at furnaces and Lake Erie docks, as compared with 32,034,619 tons on the same date a year ago. The amount at furnaces Feb. 1 was 27,278,906 tons. During January, furnaces in the Central district consume 2,433,346 tons, a decrease of 43,328 tons for the month. Lake front furnaces consumed 1,826,325 tons, a gain of 71,299 tons. Eastern furnaces used 115,656 tons, an increase of 14,741 tons, and all-rail furnaces used 148,536 tons, a decrease of 4555 tons. There were 171 furnaces using Lake ore in blast Jan. 31, or the same number that was operating on Dec. 31.

**Pig Iron.**—Sales were heavy during the past week, and some of the larger consumers are now in the market with inquiries for substantial lots, running up to 20,000 tons. Sales by Cleveland interests during the week aggregated 53,000 tons. Sales and inquiries for the most part are for deliveries extending through the second quarter. Some of the Lake furnaces are taking a little firmer stand on prices because their order books are now fairly well filled. One local producer has a number of quotations of \$17.50 out on foundry and malleable iron, but another is now asking \$18, furnace, for outside shipments. One Valley producer is still quoting \$18, furnace, having gone to this price because of Cleveland competition. Cleveland iron at \$17.50 continues to reach a widely extended market.

### Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	2.00c.
Mild steel bars	2.00c.
Reinforcing steel bars	2.75c. to 3.00c.
Cold-finished rounds and hexagons	3.90c.
Cold-finished flats and squares	4.40c.
Hoops and bands	2.65c.
No. 24 black sheets	2.65c.
No. 10 blue annealed sheets	2.15c.
No. 34 galvanized sheets	4.50c.
Cold-rolled strip	*5.95c.
No. 9 annealed wire, per 100 lb.	\$2.90
No. 9 galvanized wire, per 100 lb.	2.25
Common wire nails, base, per keg	2.90

\*Net base, including boxing and cutting to length.

extending into southern Michigan and eastern Ohio, as well as into southern Ohio. One Lake furnace during the week took 1000 tons for the Cincinnati plant of the Worthington Pump & Machinery Corporation. Reports indicate that a Buffalo producer is attempting to reach some points in eastern Michigan with a price of \$17, furnace. The ruling price of producers serving that State is \$19, furnace. Orders were placed by several Cleveland foundries during the week, including one for approximately 2000 tons. The Westinghouse Electric & Mfg. Co. has an inquiry out that includes 1000 tons for its Cleveland plant. The Link-Belt Co., Indianapolis, inquired for 3000 tons of malleable iron, which is reported to have been placed. A Port Huron, Mich., consumer has purchased 1000 tons of foundry iron.

Quotations below are per gross ton and except on basic and low phosphorus iron, are delivered Cleveland, including a 50c. switching charge for local iron. Ohio silvery and Southern iron prices are based on a \$3 freight rate from Jackson and \$6 from Birmingham:

Basic, Valley furnace	\$18.00
N'th No. 2 fdy., sil. 1.75 to 2.25	19.00
Southern fdy., sil. 1.75 to 2.25	24.00
Malleable	19.00
Ohio silvery, 8 per cent.	31.50
Standard low phosph., Valley furn.	28.00

**Semi-Finished Steel.**—Specifications against recent orders are good, but there is not much new demand. Quotations by the leading local producer are unchanged at \$34, Cleveland, for sheet bars, billets and slabs.

**Sheets.**—Several of the Ohio mills now have a good tonnage on their books from the automotive industry, but there are enough that need business to keep prices down to recent levels and new demand is not very active. A Detroit automobile manufacturer placed around 500 tons of black sheets during the week at 2.75c., Pittsburgh. The usual Ohio mill range is 2.80c. to 2.90c., mill, although a price of 2.70c., mill, is reported. The common range on blue annealed sheets is 2.20c. to 2.25c., Ohio mill, but the lower price is still being shaded at least \$2 a ton. Prices are holding better on the wide than on the narrow material. The more common quotations on galvanized sheets are 3.65c., Pittsburgh, and 3.70c., Ohio mill.

**Strip Steel.**—Prices on wide strip, which have been very irregular with some of the mills quoting net delivered prices, have become more stabilized and have settled down to a 1.90c., Pittsburgh, base. One Ohio mill will take orders at that price for the second quarter. However, efforts are being made to stiffen up prices to 2.10c. for material wider than 6 in. and to 2.30c. for narrow strip and bands. A fairly heavy tonnage has been booked at the prevailing price. Cold-rolled strip is unchanged at 2.85c. to 3c., Cleveland, with prices up to 3.25c. for small lots.

**Reinforcing Bars.**—Inquiry is out for a stadium for the University of Michigan, which is expected to require 2000 tons, but not much other work is being figured on. Prices are unchanged at 1.70c. to 1.80c., mill, for rail steel bars and at 1.90c. to 2c. for new billet steel bars.

**Coke.**—Furnace coke is firmer, ranging from \$3.50 to \$4 per net ton, ovens. Heating coke is holding to the late advance and ranges from \$3.40 to \$3.50, ovens. Connellsville foundry coke is unchanged at \$4 to \$5.25, ovens. Some inquiry is coming out for foundry coke contracts for the second quarter, evidently being stimulated by the possibility of a coal strike April 1.

**Bolts, Nuts and Rivets.**—Specifications against contracts are fairly good, showing some gain as compared with early in the month. No shading of the regular discounts is reported. Rivet orders are rather slow, and the market lacks strength, although small-lot business is moving at the commonly quoted price of \$2.60 per 100 lb.

**Alloy Steel.**—With an improved demand from the automotive industry, Ohio mills are operating at a better rate than earlier in the month. Prices are holding well to the minimum quotations shown in the published price schedule, page 599.

**Old Material.**—The market shows a weaker tone, particularly on steel-making scrap. Activity is still

confined to a limited amount of buying by dealers to cover orders with a local consumer. Heavy melting steel has declined about 25c. a ton, as dealers are no longer finding it necessary to pay above \$14.50 to get No. 1 material. Some borings and turnings are moving at \$11.50 to \$11.75. Scrap is more plentiful at ruling prices than a few weeks ago. Railroad malleable has again declined, evidently because there is at present no local demand for this material.

We quote per gross ton, delivered consumers' yards in Cleveland:

Heavy melting steel No. 1	\$14.50 to \$14.75
Heavy melting steel No. 2	14.00 to 14.25
Rails for rolling	16.25 to 16.50
Rails under 3 ft.	18.00 to 18.50
Low phosphorus billet, bloom and slab crops	18.00 to 18.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Low phosphorus forging crops	16.50 to 17.00
Cast iron borings	11.50 to 11.75
Machine shop turnings	9.00 to 9.25
Mixed borings and short turnings	11.50 to 11.75
Compressed sheet steel	13.75 to 14.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Steel axle turnings	12.50 to 13.00
No. 1 cast	16.00 to 16.50
No. 1 busheling	12.00 to 12.50
No. 2 busheling	11.50 to 11.75
Drop forge flashings, 15 in. and under	14.00 to 14.50
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Pipes and flues	10.00 to 10.50

## Philadelphia

### Steel Business Increases Slightly But Price Weakness Continues

PHILADELPHIA, Feb. 21.—A moderate increase in the volume of steel business with continued weakness in prices marked the situation in this district during the past week. There is fresh weakness in structural shapes, with some mills quoting 1.85c., Pittsburgh, on carload orders which hitherto had been adhering to 1.90c. Black and galvanized sheets show no strength, but there is apparently less cutting on blue annealed. Black sheets have been sold at 2.75c., Pittsburgh, and galvanized at 3.60c. and 3.65c., Pittsburgh.

Sales of basic pig iron totaling 5000 tons at \$21, delivered, were the only important transactions in that branch of the market. The scrap market continues dull, and prices are weak and, in some cases, lower.

**Pig Iron.**—A steel company has bought 5000 tons of basic pig iron at \$21, delivered, from two furnace companies. Sales of foundry iron have not been large, totaling perhaps a few thousand tons, on which prices remained firm at \$21, furnace, for the base grade. There is some question as to what eastern Pennsylvania furnaces may do in meeting competition of New York

### Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Tank steel plates, $\frac{3}{4}$ -in. and heavier	2.80c. to 3.00c.
Tank steel plates, $\frac{1}{2}$ -in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)	2.90c. to 3.20c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, $1\frac{1}{2}$ x $1\frac{1}{2}$ in.	3.50c.
Round-edge steel, pianished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	4.00c. to 4.25c.
Steel bands, No. 12 gage to $\frac{1}{2}$ -in., inclusive	3.75c. to 3.90c.
Spring steel	5.00c.
No. 24 black sheets	4.15c.
No. 10 blue annealed sheets	3.20c.
No. 24 galvanized sheets	5.10c.
Diamond pattern floor plates, $\frac{3}{4}$ -in.	5.30c.
Rails	5.50c.
Swedish iron bars	3.20c.
Tool steel	6.60c.
	8.50c.

State furnaces in the territory lying between the two producing districts, but so far as the immediate Philadelphia district is concerned there appears to be no disposition to make concessions to obtain orders. Furnace operators are watching developments in the bituminous coal situation, and if a strike April 1 becomes a certainty the furnaces probably will sell more cautiously. Low phosphorus iron continues firm at \$25, furnace, for either copper free or copper bearing. English low phosphorus iron is now being offered for delivery here in April at \$25, Philadelphia.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25	\$21.76 to \$22.26
sl. . . . .	22.26 to 22.76
East. Pa. No. IX . . . . .	22.76 to 23.26
Basic, delivered eastern Pa. . . . .	21.00 to 21.39
Gray forge . . . . .	21.00 to 21.50
Malleable . . . . .	22.50 to 23.00
Standard low phos. (f.o.b. New York State furnace) . . . . .	25.00
Copper bearing low phos. (f.o.b. furnace) . . . . .	25.00 to 26.00
*Virginia No. 2 plain, 1.75 to 2.25	26.17 to 26.67
sl. . . . .	26.67 to 27.17

\*The freight rate from Virginia furnaces to Philadelphia is \$5.17 per gross ton.

**Ferromanganese.**—Sales are infrequent and are in small lots, with the price unchanged at \$100, seaboard. Domestic ferromanganese dominates the market, very little of the English having been sold.

**Plates.**—Orders for plates from the railroads for car and locomotive repairs are in fairly good volume, making up to some extent for a lack of activity in some other consuming lines. A Pittsburgh mill will furnish about 9000 tons of plates to the Sun Shipbuilding Co. for three oil tankers that company will build, two for the Sun Oil Co. and one for the Pacific Petroleum Co. On large tonnages the prevailing price of 1.90c., Pittsburgh, has been shaded, but ordinary lots are being quite uniformly quoted at 1.90c., and eastern mills report they are having no difficulty in getting it.

**Old Material.**—The scrap market continues dull and prices are weak, with minor declines in several items. Aside from one large tonnage of blast furnace scrap bought at \$11, delivered, there has been no mill buying of importance, but brokers have contracts which they are filling at prices which many shippers do not find satisfactory, but which they nevertheless are accepting. The supply of scrap seems to be ample for all demands.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel . . . . .	\$14.50 to \$15.00
Scrap T rails . . . . .	14.00 to 14.50
No. 2 heavy melting steel . . . . .	13.00
Steel rails for rolling . . . . .	16.50 to 17.00
No. 1 low phos., heavy, 0.04 per cent and under . . . . .	19.50 to 20.00
Couplers and knuckles . . . . .	17.00 to 17.50
Rolled steel wheels . . . . .	17.50
Cast iron carwheels . . . . .	16.00 to 16.50
No. 1 railroad wrought . . . . .	17.00 to 17.25
No. 1 forge fire . . . . .	12.50 to 13.00
Bundled sheets (for steel works) . . . . .	11.50 to 12.00
No. 1 blast furnace scrap . . . . .	10.50 to 11.00
Machine shop turnings (for steel works) . . . . .	11.50 to 12.00
Machine shop turnings (for rolling mill) . . . . .	12.00 to 12.50
Heavy axle turnings (or equivalent) . . . . .	13.50 to 14.00
Cast borings (for steel works and rolling mill) . . . . .	12.00 to 13.00
Cast borings (for chemical plant) . . . . .	15.00 to 16.50
No. 1 cast . . . . .	17.00 to 17.50
Heavy breakable cast (for steel works) . . . . .	15.00 to 16.50
Railroad grate bars . . . . .	12.50
Stove plate (for steel works) . . . . .	12.50
Wrought iron and soft steel pipes and tubes (new specifications) . . . . .	13.50 to 14.00
Shafting . . . . .	18.50 to 19.00
Steel axles . . . . .	21.00 to 22.00

**Structural Material.**—Although the volume of orders for plain material has been slightly better in the past week, prices continue weak. Sales of carload lots at 1.85c., Pittsburgh, have been made by mills which up to this time have been adhering to 1.90c. as a minimum on minor tonnage. The market range is now 1.75c. to 1.90c., Pittsburgh, but there has been such keen competition for orders of desirable size that some transactions have been at as low a figure as 1.60c., Pittsburgh. A Philadelphia warehouse distributor has

sold shapes out of stock to other jobbers at 2.17c., Philadelphia, equivalent to 1.85c., Pittsburgh.

**Bars.**—Among the lines which have shown improvement in the past week in volume of orders is steel bars. The going price on anything from a carload up is 1.90c., Pittsburgh. A Philadelphia warehouse distributor has sold steel bars out of stock to other distributor at 2.22c., Philadelphia.

**Sheets.**—There is continued weakness in black and galvanized sheets, but less cutting on blue annealed. The usual range on black sheets is 2.75c. to 2.85c., Pittsburgh, while galvanized sheets are being sold at prices ranging from 3.60c. to 3.75c., Pittsburgh. Blue annealed sheets are in most cases being sold at 2.20c., Pittsburgh, with an occasional concession of \$1 a ton. These prices apply only for delivery over the remainder of this quarter. Mills are not willing to make second quarter contracts except at advances.

**Imports.**—Last week's imports at Philadelphia included the following: 650 tons of pig iron from the Netherlands; 1000 tons of chrome ore from Greece; 500 tons of manganese ore from Java; 277 tons of steel bars and 25 tons of structural shapes from the Netherlands; 23 tons of wire rods from Italy; 90 tons of hoop steel from England; 18 tons of hollow steel bars from Sweden.

### Steel Drum with Removable Head Designed for Liquids

A steel drum with a removable head designed for holding liquids has been brought out by the Republic Steel Package Co., 7930 Jones Road, Cleveland. The barrel is flanged at its head end and the flange is supported on the outside by a reinforcing ring made of  $1\frac{1}{2}$  x  $1\frac{1}{4}$  in. angle iron turned almost circular in form at its upper side. The head is also flanged and when in place its flange rests against the flange of the barrel. A rubber or cork gasket is placed between the two flanges to assure a tight joint.

The head is locked to the barrel by a contracting lock ring formed from a 12-gage band to fit around the flanges of the head and barrel. After the ring is made in its circular form in a die it is cut in two at one point and lugs are welded to the ends on the inner side. In locking the drum the ring is placed over the flanges and its ends are drawn tightly together by one lock bolt in the lugs, which are then below and inside the chime. As the bolt is tightened, drawing the lugs together, the ring, acting as a fulcrum, slides down on the inclined plane of the reinforcing member on the outside and draws down on the top of the cover on the inside, making, it is claimed, a liquid tight joint on the head of the drum. The head can be removed quickly by loosening the locking bolt. The locking ring gives protection against damage to the container during transit and added strength against internal pressure. The removable parts can be replaced if they become defective.

The drum is made of black sheets, plain or tin lined, and of hot dipped galvanized sheets in 30- and 55-gal. sizes. It is designed for use as a container for paints, lacquers, chemicals and food products. It can be equipped with fittings for agitators which may be installed or left out as desired. An important advantage of a drum with removable head, it is pointed out, is that it can be more thoroughly cleaned for re-use than drums not having removable heads and the cost of cleaning is much lower. One field that is expected to be developed for the container is for shipping products to the Orient. When their contents are removed they can be steamed out and used for bringing oils back to this country.

The Republic Steel Package Co., in connection with the Gross Lead Burning Corporation, Cleveland, has developed a lead-lined steel barrel as a container for corrosive liquids to take the place of glass carboys. Samples of this barrel have been tried out and are said to have proved satisfactory. They conform to the requirements of 5 A specifications of the Interstate Commerce Commission and they have been submitted to the commission for its approval.

## Boston

### Heater Manufacturer Buys Large Tonnage of Pig Iron at Low Prices

BOSTON, Feb. 21.—Interest in the pig iron market in the past week centered largely in purchases by a Massachusetts heater manufacturer. The tonnage bought is reported as more than 15,000 tons of No. 2 plain, with deliveries running into the third quarter, two Buffalo district steel works furnaces and a New York State merchant furnace being willing to accept third quarter business. The tonnage was split up among four or five furnaces, and some of the iron was bought at delivered prices equivalent to \$17 a ton, Buffalo, and less. A Worcester, Mass., foundry has bought 600 tons of mixed foundry grades for March, April, May and June delivery, and a Springfield, Mass., foundry has closed for 500 tons of No. 1X at prices equivalent to \$17.50, base, Buffalo furnace. Business otherwise was confined to small tonnages obtained on solicitation. Aggregate sales for the week were approximately 20,000 tons. Prices appear to be more unsettled than they were before the heater maker's purchase.

We quote delivered prices per gross ton to most New England points as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$6.91 to \$8.77 from Alabama:

East. Penn., sil. 1.75 to 2.25	\$24.15 to \$24.65
East. Penn., sil. 2.25 to 2.75	24.65 to 25.15
Buffalo, sil. 1.75 to 2.25	21.91 to 22.41
Buffalo, sil. 2.25 to 2.75	22.41 to 22.91
Virginia, sil. 1.75 to 2.25	26.92 to 27.42
Virginia, sil. 2.25 to 2.75	27.42 to 27.92
Alabama, sil. 1.75 to 2.25	24.91 to 26.77
Alabama, sil. 2.25 to 2.75	25.41 to 27.27

**Cast Iron Pipe.**—Boston has yet to award 3000 tons, Worcester, Mass., 1000 tons, Springfield, Mass., 700 tons, and Lynn, Mass., 300 tons. Bids on these tonnages were closed last week or earlier. R. D. Wood & Co. was the low bidder on the Worcester business. Bids on 30-in. pipe wanted by that city ranged from \$49.90 to \$50.70 a ton; on the 12-in. pipe, from \$50.50 to \$55.20; on the 8-in. pipe, from \$50.90 to \$55.20; on the 6-in. pipe, from \$50.90 to \$55.20, and on the 4-in. pipe, from \$54.90 to \$56, while composite bids on the five sizes of pipe ranged from \$51.50 to \$54.30. Abingdon, Mass., has closed with the Warren Foundry & Pipe Co. for its 1927 pipe requirements, amounting to several hundred tons. Prices quoted openly on domestic pipe show little variation. Foundries are not so anxious for large pipe business as heretofore; consequently prices are steadier. Prices are: 4-in., \$58.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$53.10 to \$54.10; larger pipe, \$52.10 to \$53.10. A \$5 differential is asked on Class A and gas pipe.

**Finished Material.**—At the moment steel fabricators have no prospects of importance under consideration. Indications are that several small jobs, ranging from 150 to 250 tons, will come on the market soon. Numerous reinforcing tonnages for which bids have been in for weeks are apparently no nearer closing than a

#### Warehouse Prices, f.o.b. Boston

Base per Lb.

Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Plates	3.365c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

week ago. New tonnages are coming out slowly. The improved demand for finished steel products noted early in the month is not holding. For plates, standard shapes and bars the prevailing price is 1.90c. per lb., base Pittsburgh.

**Warehouse Business.**—There has been a further slowing up in the movement out of local warehouses, and collections are rather slow. Wire nails from stock are now \$3.40 per 100 lb. Heretofore some warehouses sold at \$3.70 per keg.

**Coke.**—New England-made by-product foundry coke is selling at \$12.50 a ton, delivered, within a \$3.10 freight rate zone. Specifications against first half contracts are running along just about as they did a week ago. There is no life to business. The demand for by-product domestic coke has fallen off noticeably because of warmer weather.

**Old Material.**—Scrap supplies in New England are still in excess of demand, and prices continue soft. Because of this situation large dealers with ample yard space are not stocking material even at the low prevailing prices. Buying therefore is confined to actual needs, and as mills are ordering little material the market is less active than it has been in months. The best dealers will do on heavy melting steel today is \$10 a ton, on cars shipping point, and \$8 on forged flashings. These prices represent a drop of 50c. a ton. Scrap rails are off 50c. a ton with heavy melting steel, and yard steel is now \$7.50 to \$8, contrasted with \$8 to \$8.50 a week ago.

The following prices are for gross-ton lots, delivered at consuming points:

Textile cast	\$18.00 to \$18.50
No. 1 machinery cast	17.00 to 17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	13.00 to 13.25
Railroad malleable	16.50 to 17.00

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$9.50 to \$10.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 yard wrought	11.00 to 11.25
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.50 to 9.00
Machine shop turnings	6.50 to 7.00
Cast iron borings, chemical	10.00 to 10.50
Cast iron borings, rolling mill	7.50 to 8.00
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap	7.50 to 8.00
Bundled skeleton, long	7.60 to 8.00
Forged flashings	7.50 to 8.00
Shafting	15.00 to 15.50
Street car axles	15.50 to 16.00
Rails for rerolling	11.00 to 11.50
Scrap rails	9.50 to 10.00

## Birmingham

### Pig Iron Sales Slow—Pipe Shop Back-logs Increase—Scrap More Active

BIRMINGHAM, Feb. 21.—Furnace interests look for a higher base price on pig iron, although sales for second quarter delivery are still being made at \$18, Birmingham, for No. 2 foundry. No third quarter inquiries have been reported. Selling recently has been a little slow. Small-lot consumers have been paying a \$1 premium, but the tonnage they have placed does not bulk large in the aggregate. In general, the melt in this district is large and promises to increase. The demand for pressure pipe is very strong, although activity is lagging with producers of soil pipe and fittings. Many smaller shops turning out specialties, in which foundry iron is used, are working steadily and are melting from 10 to 50 tons each daily. Surplus stocks of foundry iron in furnace yards are not large. Eleven blast furnaces are still on foundry and 11 on basic, while one is producing specialty iron. The surplus of foundry iron has increased little, if any, since the first of the year. Unless there should be a spurt in buying, output will continue at the present rate until April.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil.	\$18.00
No. 1 foundry, 2.25 to 2.75 sil.	18.50
Basic	18.00
Charcoal, warm blast	29.00

**Rolled Steel.**—With practically all open-hearth furnaces in shape in the district producing steadily, steel production is keeping up at a good pace. Liberal orders for railroad track accessories have been booked recently, and accessory shops, as well as the rail mill and car works, are operating at capacity. The Gulf States Steel Co. has four out of six open-hearth furnaces in operation, with its finishing mills operating close to capacity. Reports are that this company is considering extensive improvements, which will be passed on at its annual meeting in the next few weeks. General quotations on steel show very little change. Plates and bars are in good demand.

**Cast Iron Pipe.**—Lettings of the last few days have added considerably to the unfilled tonnage on pipe shop books. Foundry operations and shipments are at a high rate. Pipe prices have been weak, but they are growing firmer. The base price ranges from \$36 to \$37, per net ton, Birmingham, for 6-in. and larger pipe. Much iron is being melted in this industry. The soil pipe and fittings trade is sluggish, with few of the numerous shops operating at more than 50 per cent. Prices on soil pipe are weak.

**Coke.**—Weather conditions are affecting the coke market to some extent, but there has been no curtailment of production, all by-product coke ovens of the district operating steadily. The Tennessee Coal, Iron & Railroad Co., in rounding out its plants in the Ensley-Fairfield section, has just completed a conveyor system from the bottom of coal mine No. 8 to its large by-product plant at Fairfield that eliminates labor in handling coal from mine to ovens. Foundry coke prices are unchanged, being around \$5.50 per net ton, Birmingham. Coal production in Alabama is steady at around 410,000 tons weekly. No storing of coal is to be observed here, but in case of an emergency after April 1 Alabama mines will increase output 50,000 to 60,000 tons weekly.

**Old Material.**—The recent decline in heavy melting steel brought out some buying. Larger consumers have been purchasing considerable tonnage, paying \$12, delivered. This product has been quoted for the past several weeks at \$13. Cast scrap is also an active grade, with pipe shops using the largest quantities.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

Cast iron borings, chemical	\$15.50 to \$16.00
Heavy melting steel	12.00 to 12.25
Railroad wrought	11.00 to 12.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
Steel rails	12.50 to 13.00
No. 1 cast	15.00 to 16.00
Tramcar wheels	15.00 to 16.00
Carwheels	14.00 to 15.00
Stove plate	13.00 to 14.00
Machine shop turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Rails for rolling	15.00 to 16.00

### Detroit Scrap Prices Unchanged

**DETROIT.** Feb. 21.—Most of the melters in the district have covered on their pig iron requirements for second quarter, and indications are that melt will be maintained on a high basis. March schedules of the automobile manufacturers are generally about the same as for present month. Scrap prices are unchanged from a week ago.

Heavy melting and shoveling steel	\$13.00 to \$13.50
Borings and short turnings	8.50 to 9.00
Long turnings	7.75 to 8.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	17.50 to 18.00
Hydraulic compressed	11.25 to 11.75
Stove plate	13.50 to 14.50
No. 1 busheling	11.00 to 11.50
Sheet clippings	8.25 to 8.75
Flashings	11.25 to 11.75

Retail prices of food in January are reported by the United States Bureau of Labor Statistics to have declined 1½ per cent from December, and 3 per cent from January, 1926. The index number in January was 159.3 compared with an 1913 average of 100. It was 161.8 in December and 164.3 in January, 1926.

## San Francisco

### Southern Pacific to Buy 1200 Cars —Storms Curb Trade

**SAN FRANCISCO.** Feb. 21 (By Wire).—Bids will be opened March 1 by the Southern Pacific Co., San Francisco, on 10 three-cylinder type locomotives, 1000 gondola cars and 200 tank cars. In Los Angeles, the Los Angeles County Flood Control District will open bids March 21 on about 1800 tons of rails for the San Gabriel Canyon Railroad. Business on the entire Pacific Coast has been restricted during the past week by severe storms, accompanied by heavy rains and high winds.

**Pig Iron.**—There have been no fresh developments, and prices remain unchanged.

*Utah basic	\$25.00 to \$26.00
*Utah foundry, sll.	2.75 to 3.25
**Indian foundry, sll.	2.75 to 3.25
**German foundry, sll.	2.75 to 3.25

\*Delivered San Francisco.

\*\*Duty paid, f.o.b. cars San Francisco.

**Shapes.**—Lettings for the week total 3950 tons. Mill quotations are unchanged. The largest individual letting, 1800 tons, for a theater in Los Angeles, was taken by the Baker Iron Works. Other lettings are listed elsewhere.

**Plates.**—The East Bay Water Co., Oakland, Cal., has awarded 500 tons for a pipe line to an unnamed fabricator, and the Southern Pacific Equipment Co., San Francisco, has placed 100 tons with an Eastern mill. Los Angeles is inquiring for 131 tons for a pipe line, on which bids close Feb. 25. Prices are unchanged at 2.25c., c.i.f. Coast ports, on large tonnages and 2.30c. on most of the going business.

**Bars.**—An unnamed firm has been awarded 152 tons for two bridges over San Juan Creek at Santa Ana, Cal. The Winchell School, Fresno, Cal., will require

### Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and structural shapes	3.00c.
Mild steel bars and small angles	3.00c.
Small angles, $\frac{1}{4}$ -in. and over	3.00c.
Small angles, under $\frac{1}{4}$ -in.	3.40c.
Small channels and tees, $\frac{1}{4}$ -in. to $2\frac{1}{4}$ -in.	3.60c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.00c.
No. 24 black sheets	4.70c.
No. 28 black sheets	5.15c.
No. 10 blue annealed sheets	3.75c.
No. 24 galvanized sheets	5.25c.
No. 28 galvanized sheets	6.15c.
Common wire nails, base per keg	\$3.75
Cement coated nails, 100-lb. keg	3.75

200 tons, the Hoquiam River bridge, Hoquiam, Wash., will take 125 tons, and there is a good-sized aggregate tonnage pending locally on jobs that will require less than 100-ton lots. Local jobbers' prices are unchanged.

**Cast Iron Pipe.**—Pasadena, Cal., has placed 2000 tons with Grinnell Co.; Sacramento, Cal., has awarded 900 tons to the United States Cast Iron Pipe & Foundry Co.; Seattle has let 143 tons to the American Cast Iron Pipe Co., and in Santa Cruz, Cal., the Grinnell Co. took 109 tons. Los Angeles will take bids March 1 on 5280 tons. Seattle has opened bids on 1302 tons for one job and 387 tons for another. Several smaller jobs are pending, and prices unchanged.

**Steel Pipe.**—The Pacific Gas & Electric Co., San Francisco, is inquiring for 490 tons of 4½ to 16-in. steel pipe and 296 tons of 8-in. Santa Barbara, Cal., has placed 115 tons of welded steel pipe with Lemmon & Lee, Santa Barbara.

Two new 600-ft. freight boats that are being built by lake shipyards for the Pittsburgh Steamship Co. have been named the A. F. Harvey, for the president of that company, and the B. F. Affleck, for the president of the Universal Portland Cement Co. Both companies are subsidiaries of the United States Steel Corporation.

## Toronto

### Algoma Blows in Furnace—Pig Iron and Scrap Dull

TORONTO, ONT., Feb. 21.—Following the reduction in Canadian pig iron prices, the demand for foundry and malleable iron has fallen off. Current sales are confined to lots ranging from 50 to 200 tons for spot delivery from melters who failed to place first quarter contracts but are content to buy as their requirements dictate. Future buying is at a standstill, because most consumers have covered for this quarter and are not yet ready to place second quarter orders. Orders against contract are appearing, and scheduled deliveries are being made on this business.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., blew in its No. 3 blast furnace on Feb. 15, in preparation for the opening of the rail mill on March 7 and the starting up of open-hearth furnaces about March 5. The No. 3 furnace will produce merchant iron while warming up for the run on basic. No. 2 furnace will be blown out, and on March 1 No. 1 furnace will be blown in. Thus the company will have two stacks in by March 1.

Local blast furnace representatives do not look for further price reductions, as present quotations are as low as they have gone since the war and are on a par with those of last summer. Present prices are as follows:

Toronto		Per Gross Ton
No. 1 foundry, sll. 2.25 to 2.75		\$24.80
No. 2 foundry, sll. 1.75 to 2.25		24.30
Malleable		24.80
Montreal		
No. 1 foundry, sll. 2.25 to 2.75		27.00
No. 2 foundry, sll. 1.75 to 2.25		26.50
Malleable		27.00
Imported Iron at Warehouse		
Montreal		
Summerlee		36.00
Carron		36.00

**Old Material**—The market has been listless. Consumers are showing little interest, and purchases have been confined to small tonnages for immediate needs. The Montreal market is correspondingly dull, with sales on spot account the only feature. Some interest is reported in export business, but this line is likewise comparatively quiet owing to the lack of activity prevailing across the international border. Dealers' buying prices are firm as follows:

Per Gross Ton		
	Toronto	Montreal
Steel turnings	\$8.50	\$8.00
Machine shop turnings	8.50	7.50
Wrought pipe	6.00	6.00
Rails	11.00	10.00
No. 1 wrought	11.00	14.00
Heavy melting steel	11.00	9.50
Steel axles	16.00	17.00
Axles, wrought iron	18.00	19.00
Boiler plate	10.00	8.50
Heavy axle turnings	9.00	8.50
Cast borings	8.50	7.50
Per Net Ton		
Standard carwheels	15.00	16.00
Malleable scrap	14.00	14.00
Stove plate	10.00	13.00
No. 1 machinery cast	16.00	18.00

### Warehouse Prices, f.o.b. St. Louis

#### Base per Lb.

Plates and structural shapes	3.25c.
Bars, mild steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
No. 24 black sheets	4.45c.
No. 10 blue annealed sheets	3.60c.
No. 24 galvanized sheets	5.25c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.65c.
Boiler rivets	3.85c.

#### Per Cent Off List

Tank rivets, $\frac{1}{8}$ -in. and smaller	70
Machine bolts	50 and 5
Carriage bolts	47 $\frac{1}{2}$
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	3.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

## St. Louis

### Pig Iron Users Lack Forward Business—Scrap Prices Drop

ST. LOUIS, Feb. 21.—The pig iron market continues quiet, with melters proceeding cautiously in their purchases in the absence of backlog orders for their own products. Stove foundries in the district are all operating, running at an average of about 60 per cent of capacity, but they complain that dealers are not buying very much ahead and much of their output is for stock. One Southern maker of pig iron has advanced foundry grade to \$19, base Birmingham, because of the increased demand from Southern pipe manufacturers. Otherwise prices are unchanged. Sales of the local maker last week amounted to about 5500 tons, including 2000 tons of basic sold to a steel mill in the district and 1000 tons for an Illinois radiator company. The remainder consisted of 100 to 500-ton lots for stove and jobbing foundries.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sll. 1.75 to 2.25..	\$22.66
Northern malleable, sll. 1.75 to 2.25 ..	22.66
Basic .....	22.66
Southern fdy., sll. 1.75 to 2.25 ..	\$22.42 to 22.42
Granite City iron, sll. 1.75 to 2.25 ..	21.81 to 22.31

**Finished Iron and Steel.**—The local mill has made no change in its sheet prices, although there is a movement among Chicago producers to insist on higher prices even at the expense of losing business. The local mill reports better bookings and has increased operations slightly. Price cutting on plates and structural shapes continues, and it is reported that quotations of less than 2c., Chicago, have been made, without stimulating any business. Warehouse business is quiet.

**Coke.**—A fair demand for coke for industrial purposes is reported, although consumers are purchasing only for immediate needs. Demand for domestic grades is light.

**Old Material.**—The market is marking time. Country dealers are holding their stocks because they regard prices as too low, local dealers are not buying because of a lack of consumer interest and a disinclination to speculate, and the consumers are not buying because they have sufficient stocks to take care of their present needs and new business is not coming in satisfactorily. Rails for rolling, frogs, switches and guards cut apart, and railroad malleable are 50c. lower, while heavy melting and shoveling steel, heavy axle and tire turnings and No. 2 railroad wrought are off 25c. Other prices are unchanged. Railroad lists include: Santa Fe, 6500 tons; Chicago, Burlington & Quincy, 4900 tons; Rock Island, 3500 tons; Chicago & Alton, 1100 tons; St. Louis-San Francisco, 700 tons; Cotton Belt, 300 tons, and Missouri Pacific, 150 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails .....	\$14.00 to \$14.50
Rails for rolling .....	14.50 to 15.00
Steel rails less than 3 ft. ....	16.00 to 16.50
Relaying rails, 60 lb. and under ..	20.50 to 23.50
Relaying rails, 70 lb. and over ..	26.50 to 29.00
Cast iron carwheels .....	14.25 to 14.75
Heavy melting steel .....	12.50 to 13.00
Heavy shoveling steel .....	12.50 to 13.00
Frogs, switches and guards cut apart .....	13.50 to 14.00
Railroad springs .....	15.50 to 16.00
Heavy axle and tire turnings .....	10.00 to 10.50
No. 1 locomotive tires .....	16.75 to 17.25

Per Net Ton	
Steel angle bars .....	12.00 to 12.50
Steel car axles .....	17.25 to 17.75
Iron car axles .....	20.50 to 21.00
Wrought iron bars and transoms .....	18.00 to 18.50
No. 1 railroad wrought .....	10.75 to 11.25
No. 2 railroad wrought .....	11.25 to 11.75
Cast iron borings .....	9.00 to 9.25
No. 1 busheling .....	10.00 to 10.50
No. 1 railroad cast .....	14.25 to 14.75
No. 1 machinery cast .....	16.00 to 16.50
Railroad malleable .....	12.00 to 12.50
Machine shop turnings .....	6.25 to 6.75
Bundled sheets .....	7.50 to 8.00

## Cincinnati

### Better Operations of Motor Plants Reflected in Orders for Silvery and Coke

CINCINNATI, Feb. 21.—With the exception of about 1100 tons of foundry iron for the local plant of the Worthington Pump & Machinery Corporation, sales in the past week have consisted of small tonnages for delivery over the remainder of the first quarter. Inquiries show a slight improvement, the largest calling for 3000 tons of malleable for an Indianapolis melter. The price situation, however, is unchanged. Lake Erie producers are soliciting business in southern Ohio at \$17.50 to \$18, base furnace, and are successful in obtaining the majority of the attractive orders. A central Ohio producer is quoting malleable grades at \$18.75, base furnace, to meet the prices quoted by northern Ohio competitors in territory up-State but is asking \$19 to \$19.50, furnace, in Cincinnati and immediate vicinity. Sellers in the Ironton district have not altered the policy outlined last week. Southern iron at \$18, base Birmingham, is quiet. Increased operations in the automotive industry have resulted in a better demand for Jackson County silvery, which is steady at \$28.50, furnace, for 8 per cent.

Based on freight rates of \$3.69 from Birmingham and \$1.89 from Ironton, we quote f.o.b. Cincinnati:

Alabama fdy., all. 1.75 to 2.25 (base) . . . . .	\$21.69
Alabama fdy., all. 2.25 to 2.75 . . .	22.19
Tennessee fdy., all. 1.75 to 2.25 . . .	21.69
Southern Ohio silvery, 8 per cent . . .	30.39
So. Ohio fdy., all. 1.75 to 2.25 . . .	20.89
So. Ohio malleable . . . . .	\$20.64 to 21.89

**Finished Material.**—Although there has been no perceptible improvement in the price situation, orders and specifications have increased somewhat in the past week, with the result that the market has a better tone. Apparently the downward movement of sheet prices has been definitely halted, because consumers admit that they no longer can obtain the favorable terms offered 10 days to two weeks ago by several independent mills. In some cases producers have refused to accept orders calling for delivery well into the second quarter, because they are of the opinion that it will not be long until an upward trend in prices will set in. Galvanized sheets are in moderate demand at 3.75c., base Pittsburgh, and blue annealed are selling at 2.20c., base Pittsburgh. Sales of black sheets at 2.80c., base Pittsburgh, have been fairly good. Automobile body sheets are quoted at 4.15c., base Pittsburgh, but only small quantities are being shipped to consumers in this territory. Sheet mill operations in the southern Ohio district continue on about a 90 per cent basis. Bars and structural steel stand at 1.90c., base Pittsburgh, although an attempt is being made to secure 2c. on small lots of bars. While there is a marked absence of sizable structural projects at the moment, fabricators are consistently taking small tonnages of plain material on contract. Gas holder fabricators in Cincinnati are reported to be running on a satisfactory schedule. The

recent decline in wire goods has had the effect of bringing consumer buying almost to a standstill. Common wire nails are quoted at \$2.55 per keg, base Pittsburgh, or \$2.60, base Ironton, while plain wire is \$2.40 per 100 lb., base Pittsburgh or Ironton.

**Reinforcing Bars.**—Quietness still prevails, no important jobs having appeared in the past week. New billet stock is quoted at 1.90c., base Pittsburgh, and rail steel bars at 1.80c., base mill, although these prices have not been tested recently.

**Warehouse Business.**—Sales were in fair volume in the past week, but the total tonnage was rather light. Business in the first 20 days of February, however, is slightly ahead of that in the same period last year. Plates and sheets have been the leading products in number of orders. Structural steel also has been moving well for this time of the year. Prices are firm.

**Coke.**—Specifications for by-product foundry coke in the first 20 days of February increased 20 per cent compared with the corresponding period in January. The improvement is attributed partly to the large contract requirements of automobile manufacturers in the Detroit district. The flurry of cold weather in the past few days has brought out a limited call for by-product domestic coke. Beehive coke companies in the Wise County and New River territories report a fairly brisk movement of foundry grades. Prices remain firm and unchanged.

Based on freight rates of \$2.14 from Ashland, Ky., and \$2.59 from Wise County ovens and New River ovens, we quote f.o.b. Cincinnati: Wise County foundry, \$7.59 to \$8.09; New River foundry, \$10.09 to \$10.59; by-product foundry, \$9.64 to \$10.14.

**Old Material.**—A slightly weaker tone has developed in the market. Mills are accepting a fair amount of material on contract but will buy ahead if dealers are willing to take business on the basis suggested by the steel plants. Prices are holding moderately well.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

	Per Gross Ton
Heavy melting steel . . . . .	\$12.50 to \$13.00
Scrap rails for melting . . . . .	12.50 to 13.00
Short rails . . . . .	17.50 to 18.00
Relaying rails . . . . .	26.50 to 27.00
Rails for rolling . . . . .	14.00 to 14.50
Old carwheels . . . . .	12.00 to 12.50
No. 1 locomotive tires . . . . .	16.50 to 17.00
Railroad malleable . . . . .	14.50 to 15.00
Agricultural malleable . . . . .	12.50 to 14.00
Loose sheet clippings . . . . .	8.50 to 9.00
Champion bundled sheets . . . . .	9.50 to 10.00

	Per Net Ton
Cast iron borings . . . . .	8.00 to 8.50
Machinist shop turnings . . . . .	7.50 to 8.00
No. 1 machinery cast . . . . .	16.00 to 17.00
No. 1 railroad cast . . . . .	12.00 to 13.50
Iron axles . . . . .	19.50 to 20.00
No. 1 railroad wrought . . . . .	9.00 to 9.50
Pipes and flues . . . . .	7.50 to 8.00
No. 1 busheling . . . . .	9.00 to 9.50
Mixed busheling . . . . .	6.00 to 6.50
Burnt cast . . . . .	7.00 to 7.50
Stove plate . . . . .	9.00 to 9.50
Brake shoes . . . . .	9.50 to 10.00

### Active Production and Shipments in Youngstown District

YOUNGSTOWN, Feb. 21.—Of the 39 blast furnaces in this district, 22 are in production, including nine of 18 Steel Corporation stacks. The Steel Corporation has four furnaces idle in this section, including one at the Ohio Works, which is being rebuilt; two at the New Castle, Pa., plant and one at Farrell, Pa. Of the independent furnaces, ten are being operated by steel-making interests. The Republic Iron & Steel Co. and the Youngstown Sheet & Tube Co. are operating four each, the Trumbull-Cliffs Furnace Co. one and the Sharon Steel Hoop Co. one. Three merchant stacks are in blast, one each being operated by the Stewart Furnace Co., the Shenango Furnace Co. and the Reliance Iron & Coke Co.

The Trumbull Steel Co. bids fair to establish a new record for shipments and production. The company's strip mills will operate to Saturday midnight, according to announced schedules, and will resume Sunday midnight. Its finishing mills are operating in

#### Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes . . . . .	3.40c.
Bars, mild steel or iron . . . . .	3.30c.
Reinforcing bars . . . . .	3.30c.
Hoops . . . . .	4.00c. to 4.25c.
Bands . . . . .	3.95c.
Cold-finished rounds and hexagons . . . . .	3.85c.
Squares . . . . .	4.35c.
Open-hearth spring steel . . . . .	4.75c. to 5.00c.
No. 24 black sheets . . . . .	4.05c.
No. 10 blue annealed sheets . . . . .	3.60c.
No. 24 galvanized sheets . . . . .	4.90c.
Structural rivets . . . . .	3.75c.
Small rivets . . . . .	65 per cent off list
No. 9 annealed wire, per 100 lb . . . . .	\$3.00
Common wire nails, base per keg . . . . .	2.95
Cement coated nails, base per 100-lb. keg . . . . .	3.15
Chain, per 100 lb . . . . .	7.55
Net per 100 Ft.	
Lap welded steel boiler tubes, 2-in . . . . .	\$18.00
4-in . . . . .	28.00
Seamless steel boiler tubes, 2-in . . . . .	19.00
4-in . . . . .	39.00

full, but one open hearth furnace is suspended for repairs.

The Youngstown Sheet & Tube Co. has awarded the contract for rebuilding A blast furnace in its Campbell group to the William B. Pollock Co., Youngstown.

This week 43 of 53 independent open-hearth furnaces in the Youngstown district are in production; 110 of 127 sheet mills, and 14 of 18 pipe mills. Merchant bar mills are at a 65 to 70 per cent capacity rate. The Republic Iron & Steel Co. has substantially enlarged the schedules of its bar mills.

The Truscon Steel Co. looks for heavy spring building operations, with the release of much business in reinforcing steel bars and other metal building products.

Sheet makers have one to three weeks' backlog on their books, but prices are not showing the response to improved buying which was generally looked for. Heavy strip steel buying is developing from automobile interests, and second quarter contracts are being placed. Mills are accepting such business at 2c. per lb., for the wide sizes in hot rolled, while the narrow widths range from 2.15c. to 2.20c. In sheets, the market has settled, for second quarter business, to 2.15c. to 2.20c. for blue annealed; 2.85c. for black and 3.75c. for galvanized. Automobile body sheets are firm at 4.15c. for No. 20 gage.

## Buffalo

### Fair Specifications in Bars and Shapes— Scrap Is Weaker

**BUFFALO**, Feb. 21.—In the pig iron market considerable Eastern business has been entered at prices figuring back to from \$17 to \$17.50, Buffalo, and in some instances even lower. An inquiry for foundry from the Worthington Pump & Machinery Corporation is understood to total 2000 tons. The General Electric Co. tonnage mentioned last week is believed to be closed. The Gould Coupler Co., Depew, N. Y., is said to have placed its malleable requirements, amounting to 2000 to 3000 tons, in the recent buying wave. Little new inquiry is appearing, and comparatively small lots are being taken.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

No. 2 plain fdy., sll. 1.75 to 2.25...	\$17.00 to \$18.00
No. 2X foundry, sll. 2.25 to 2.75...	17.50 to 18.50
No. 1X foundry, sll. 2.75 to 3.25...	18.00 to 19.50
Malleable, sll. up to 2.25...	17.00 to 18.00
Basic...	17.50 to 18.00
Lake Superior charcoal...	27.28

**Finished Iron and Steel.**—Mills are operating at around 66 per cent of capacity, largely on a single-turn basis. Bar and shape specifications are fair. The sheet market continues weak. The reinforcing bar market shows more activity. One seller has booked three small warehouses, one of which will take 100 tons. Local contractors are interested in a new Erie Railroad freight house in Youngstown, Ohio, requiring 700 tons. Some road work is beginning to come out. A local reinforcing bar maker booked three carloads last week. Most of the road work planned, however, is being held up until March 1.

**Old Material.**—The market is very soft. The mills are doing no new buying, and transactions among dealers are not in volume. Mills are operating at about 66 per cent on a single-turn basis, and their stocks ap-

### Warehouse Prices, f.o.b. Buffalo

	Base per lb
Plates and structural shapes...	3.40c.
Mild steel bars...	3.30c.
Cold-finished shapes...	4.45c.
Rounds...	3.95c.
No. 24 black sheets...	4.30c.
No. 10 blue annealed sheets...	3.80c.
No. 24 galvanized sheets...	5.15c.
Common wire nails, base per kg...	\$3.90
Black wire, base per 100 lb...	3.90

pear to be sufficient to carry them along for some time without heavy purchasing. Some sales of No. 1 machinery cast have been made to dealers at \$16 to \$16.50, and some small lots of stove plate have changed hands at \$14.50. Specialties are quiet. A few small sales of malleable have been made at \$17 to \$17.50.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$14.50 to \$15.00
Selected No. 1 heavy melting steel	15.50 to 16.00
Low phosphorus	17.50 to 18.00
No. 1 railroad wrought	13.00 to 13.50
Carwheels	16.00 to 16.50
Machine shop turnings	9.00 to 9.50
Mixed borings and turnings	11.25 to 11.75
Cast iron borings	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
Stove plate	14.50 to 14.75
Grate bars	12.00 to 13.00
Hand bundled sheets	10.50 to 11.50
Hydraulic compressed sheets	14.00 to 14.50
No. 1 machinery cast	16.00 to 16.25
Railroad malleable	16.50 to 17.00
Iron axles	24.00 to 25.00
Steel axles	16.00 to 16.50
Drop forge flashings	13.00 to 13.50

### Heavier Bookings of Fabricated Steel Plate

**WASHINGTON**, Feb. 21.—Representing 45 per cent of capacity, reports from 45 firms to the Department of Commerce show that bookings of fabricated steel plate in January totaled 33,915 tons, against 27,014 tons in December. January bookings were distributed as follows: Oil storage tanks, 14,216 tons; refinery materials and equipment, 2145 tons; tank cars, 6427 tons; gas holders, 1673 tons; blast furnaces, 638 tons; stacks and miscellaneous, 8771 tons.

### Fabricated Steel Bookings Much Lower

**WASHINGTON**, Feb. 21.—Aggregating 148,566 tons, or 54 per cent of capacity, fabricated structural steel bookings in January, as reported to the Department of Commerce by 189 firms with a capacity of 274,040 tons, showed a sharp decline under December, when bookings were 202,261 tons, or 71 per cent of capacity. Computed tonnage booked in January amounted to 171,720 tons. Computed shipments were 174,900 tons, or 67 per cent of capacity.

### Fewer Steel Barrels in January

**WASHINGTON**, Feb. 21.—Steel barrels to the number of 529,137 were produced in January, as against 539,805 in December, according to reports received by the Department of Commerce from 29 companies. January output was at the rate of 48.1 per cent, as against 50 per cent in December. Stocks on hand at the end of January were 51,409 barrels. Unfilled orders for delivery within 30 days represented 244,108 barrels, while orders for delivery beyond 30 days were for 1,544,086 barrels.

Reports to the Steel Barrel Manufacturers' Association, Cleveland, show that the members had a \$1,245,680 month in January. Their shipments were 365,438 barrels, representing 51.7 per cent of their producing capacity. Daily capacity for I.C.C. barrels was engaged only 28.7 per cent, against 58.4 per cent for light barrels. All shipments were domestic, except three barrels to Canada. New Jersey received 121,425, or 33 per cent of the total; Pennsylvania, 49,097; New York, 45,469.

Dredging and port development planned for the Port of Albany, N. Y., will represent an investment of more than \$20,000,000, according to the first annual report of the Albany Port District Commission, just issued. It is planned to create a deep-water terminal at Albany, so that shipments may be made directly into ocean-going steamers from railroads or canal shipments reaching the port from the north and west.

## FABRICATED STRUCTURAL STEEL

### Although Awards Are Light, Inquiries Total More Than 47,000 Tons

Better prospects for fabricated structural steel are seen in an increasing number of inquiries, which in the past week have totaled upward of 47,000 tons. Among the larger jobs pending are: National City Bank, New York, 6000 tons; a hotel at Houston, Tex., 6000 tons; telephone building at Dallas, Tex., 4000 tons; three buildings in Chicago totaling 11,500 tons. The largest award was 8000 tons for a bank and office building in Detroit. Awards follow:

BELLOWS FALLS, Vt., 400 tons, power house for Sherman Power Co., to an unnamed fabricator.

NEW YORK, 1430 tons, Wilson Building, 274 Madison Avenue, and building for Trust Co. of New Jersey, Newark, to Shoemaker Bridge Co.

NEW YORK, 1100 tons, loft building, West Fortieth Street, to an unnamed fabricator.

GREYSTONE PARK, N. J., 250 tons, New Jersey State Hospital for Insane, to American Bridge Co.

PHILADELPHIA, 1600 tons, building for Providence Trust Co., to an unnamed fabricator.

PHILADELPHIA, 200 tons, Hunting Park Avenue bridge, to McClintic-Marshall Co.

GREEN COVE SPRINGS, Fla., 200 tons, highway bridge, to Virginia Bridge & Iron Works.

AKRON, OHIO, 500 tons, building for the Beacon Journal Co., to Burger Iron Works.

DETROIT, 175 tons, boiler room addition for the Packard Motor Car Co., to Whitehead & Kales Co.

FLINT, MICH., 130 tons, building for the A. C. Spark Plug Co., to Flint Structural Steel Co.

CHICAGO, ROCK ISLAND & PACIFIC, 550 tons, bridges, to McClintic-Marshall Co.

SEATTLE, WASH., 140 tons, building for University of Washington, to East Waterway Iron Works.

SEATTLE, 100 tons, Cheasty Building, to Hofius Steel & Equipment Co.

SAN FRANCISCO, 500 tons, apartment building on Eddy Street, to Herrick Iron Works.

SAN FRANCISCO, 225 tons, addition to Hotel Whitcomb, to Central Iron Works.

SAN FRANCISCO, 150 tons, ferry terminals, to Pacific Coast Engineering Co.

SAN FRANCISCO, 100 tons, Southern Equipment Co., to an Eastern mill.

OAKLAND, 500 tons, pipe line, to an unnamed fabricator.

OAKLAND, 100 tons, addition to Merritt Hospital, to Western Iron Works.

LOS ANGELES, 150 tons, engraving plant, to Union Iron Works.

LOS ANGELES, 200 tons, theater, to Minneapolis Steel & Machinery Co.

LOS ANGELES, 1800 tons, theater, to Baker Iron Works.

NAPA, CAL., 155 tons, to Independent Iron Works.

MARCUS HOOK, PA., 100 tons, an ammonia-alum building, to Belmont Iron Works.

PERU, SOUTH AMERICA, 500 tons, International Petroleum Co. of Toronto, to Pittsburgh-Des Moines Steel Co.

YOUNGSTOWN, 300 tons, Ohio Hotel extension, to Penn Bridge Co., Rochester, Pa.

OAK, MICH., 450 tons, Pere Marquette bridge, to American Bridge Co.

DETROIT, 8000 tons, Union Trust Building, to Russell Wheel & Foundry Co.

REDWOOD CITY, CAL., 300 tons, building for the Pacific Portland Cement Co., to Pacific Rolling Mill Co., San Francisco.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

PROCTOR, Vt., 500 tons, shop for Vermont Marble Co.

NEWBURYPORT, MASS., 300 tons, repairs on highway bridge.

DANBURY, CONN., 200 tons, addition to Hotel Green.

NEW HAVEN, CONN., 300 tons, Woolworth store.

NEW YORK, 6000 tons, National City Bank, Wall and William Streets.

NEW YORK, 600 tons, apartment building, East Fifty-second Street.

NEWARK, N. J., 12,000 tons, L. Bamberger & Co., department store; George A. Fuller Co., general contractor.

DELAWARE, LACKAWANNA & WESTERN RAILROAD, 2100 tons, bridges.

PHILADELPHIA, 1500 tons, river terminal for Pennsylvania Railroad.

SEABOARD AIR LINE, 400 tons, bridges.

BALTIMORE, 600 tons, Federal Reserve Bank, Richmond, Va., branch.

SOUTHERN RAILWAY, 600 tons, bridges.

HOUSTON, TEX., 6000 tons, Sterling Hotel.

DALLAS, TEX., 4000 tons, building for Southwestern Bell Telephone Co.

DETROIT, 2000 tons, Michigan Bell Telephone Co. addition.

CHICAGO, 4000 tons, Fur Exchange Building.

CHICAGO, 3500 tons, Mercantile Exchange Building.

CHICAGO, 4000 tons, office building at 233 North Michigan Avenue.

CHICAGO, tonnage being estimated, 43-story office building for the Chicago Board of Trade.

CHICAGO, 650 tons, garage building.

HOQUAM, WASH., 582 tons, Hoquiam bridge bids postponed until March 8.

OAKLAND, 300 tons, Jackson Hotel.

OAKLAND, 275 tons, Elmhurst Telephone Building.

LOS ANGELES, 131 tons for a pipe line; bids close Feb. 25.

LOS ANGELES, 2300 tons, athletic club building.

LOS ANGELES, 120 tons, building for Illinois Pacific Glass Co.; bids in.

PHILADELPHIA, 1200 tons, two warehouses for the Pennsylvania Railroad.

PHILADELPHIA, 600 tons, St. Luke's Hospital.

SOMERTON, PA., 100 tons, bridge for the Reading Railroad.

MONTOURVILLE, PA., 450 tons, bridge for the Reading Railroad.

WESTVILLE, PA., 170 tons, three bridges for highways known as Delaware River bridge approaches.

MIDDLETOWN, OHIO, 3000 tons, American Rolling Mill Co., plant extension.

SANDUSKY, OHIO, 200 tons, theater.

BAYONNE, N. J., 250 tons, municipal stadium.

## REINFORCING STEEL

Of 4400 tons of concrete reinforcing steel bars pending, 2000 tons is for a stadium at the University of Michigan, Ann Arbor. The awards amount to 2350 tons, all small jobs. Awards follow:

HANOVER, N. H., 100 tons, Dartmouth College Library, Hegeman Harris Co., Inc., general contractor, to Bancroft & Martin Rolling Mills Co., Portland, Me.

SYRACUSE, N. Y., 500 tons, building for New York State Telephone Co., to Concrete Steel Co.

AKRON, OHIO, 850 tons, O'Neill department store, instead of 1850 tons reported last week, to Polak Steel Co.

YOUNGSTOWN, 700 tons, Erie Railroad freight house.

EVANSTON, ILL., 120 tons of rail steel, St. George High School, to Calumet Steel Co.

CHICAGO, 240 tons, St. Vincent's Asylum, to Jones & Laughlin Steel Corporation.

CHICAGO, 200 tons, bridge on Robey Street.

CHICAGO, 150 tons, superstructure for the Chatelaine Tower Apartments; Roy France, architect.

CHICAGO, 125 tons, apartment building, 2520 Kenmore Avenue; Roy France, architect.

KENOSHA, WIS., 225 tons, National bank and office building.

ST. LOUIS, 200 tons, Bishop Tuttle Memorial.

SANTA ANA, CAL., 152 tons, two bridges over San Juan Creek, to an unnamed company.

### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 210 tons, industrial building.

NEW YORK, 500 tons, Luce Building and service station, West Fifty-seventh Street; general contract not let.

NEW YORK, 250 tons, building for Adams Flanagan Co., Westchester and Third Avenues; George A. Fuller Co., general contractor.

NEW YORK, 210 tons, incinerating plant, East Seventy-third Street; Clemente Contracting Co., general contractor.

YONKERS, N. Y., 125 tons, post office; general contract not let.

FRESNO, CAL., 200 tons, Winchell School.

HOQUAM, WASH., 125 tons, bridge over Hoquiam River.

PHILADELPHIA, 250 tons, Philadelphia College of Pharmacy.

ANN ARBOR, MICH., University of Michigan stadium, 2000 tons.

BAYONNE, N. J., 200 tons, municipal stadium.

## NON-FERROUS METAL MARKETS

### The Week's Prices

Cents per Pound for Early Delivery

	Feb. 21	Feb. 19	Feb. 18	Feb. 17	Feb. 16
Lake copper, New York	13.12 1/2	13.00	13.12 1/2	13.12 1/2	13.12 1/2
Electrolytic copper, N. Y.*	12.75	12.75	12.75	12.75	12.75
Straits tin, spot, New York	70.25	..	69.50	69.62 1/2	69.00
Lead, New York	7.40	7.40	7.40	7.40	7.40
Lead, St. Louis	7.30	7.30	7.30	7.30	7.30
Zinc, New York	7.20	7.07 1/2	7.05	7.02 1/2	7.00
Zinc, St. Louis	6.85	6.72 1/2	6.70	6.67 1/2	6.65

\*Refinery quotation; delivered price 1/4c. higher.

NEW YORK, Feb. 21.—Only moderate activity has pervaded the markets in recent days. Copper prices have barely held their own in a quiet market. The generally high level of tin prices has continued and sales have been fairly large. The lead market is quieter but firm. In zinc, both the ore and the metal have advanced with demand moderately good.

**Copper.**—Buying on a heavy scale by both foreign and domestic consumers, which was in force a week ago, has largely disappeared and the market has turned quiet. While prices have remained nominally unchanged, there has been a slight tendency to shade the prevailing quotation of 13c., and one or two sales around 12.95c. delivered in the Connecticut Valley have been made. The market today is quite a little firmer, due to an advance in London of about £1 per ton, caused, it is said, by rumors of curtailed production in this country. Electrolytic copper today is quoted at 13c. delivered, with sales and inquiry very light. Copper Exporters, Inc., has not changed its quotation of a week ago, which continues at 13.37 1/2c. c.i.f. Hamburg. Lake copper is quoted at 13.12 1/2c. delivered.

**Tin.**—Despite the fact that most sellers in the past week have been disinclined to do business, the total sales have bulked fairly large, estimated at 1500 tons, including 150 tons done on Saturday. Conditions were such that buyers really had to bid to get what metal they wanted. Consumers and dealers were about equally represented in the transactions. The present

premium on prompt metal over March and April delivery continues and is likely to persist for some little time according to well informed opinion. Today, preceding the holiday tomorrow, the market has been quiet, with spot Straits tin quoted at 70.25c., New York. In London, today, prices advanced sharply to a level nearly £7 per ton higher than a week ago, with spot standard quoted at £311 5s., future standard at £300 5s. and spot Straits £321 5s. The Singapore price today was £312 5s.—nearly £9 per ton higher than a week ago. Arrivals thus far this month have been 3455 tons with 4745 tons reported afloat.

**Lead.**—No signs of weakness are detected although the market is quieter, due to lower quotations at London. The American Smelting & Refining Co. is understood to be still taking business at its contract price of 7.40c. New York. In the outside market, occasional sales are noted up to 7.60c. New York, but these need not be taken as a criterion of the eastern market. Quotations in the West continue at 7.30c. St. Louis.

**Zinc.**—Demand has been by no means light from consumers, and dealers have not been inactive during the past week. One large consumer is reported in the market today for several hundred tons for the first time in some months. Ore prices have advanced to \$44 per ton and sales at that level on Saturday were heavy. Prices during the week have gradually worked higher until on Saturday, sales were made all the way from 6.70c. to 6.75c., and today with the London market higher by 15s. per ton, the quotation here is reported at 6.85c. St. Louis, or 7.20c. New York, largely nominal.

**Antimony.**—During the week, prices sagged to as low as 13.50c. New York, duty paid, but today, quotations are stiffer, with spot delivery quoted at 14.25c. and futures at 14c.

**Nickel.**—Ingot nickel in wholesale lots is quoted at

### Metals from New York Warehouse

Delivered Prices per Lb.

Tin, Straits pig	71.50c. to 72.50c.
Tin, bar	73.50c. to 74.50c.
Copper, Lake	14.25c.
Copper, electrolytic	14.00c.
Copper, casting	13.50c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	8.25c. to 8.75c.
Lead, bar	10.75c. to 11.25c.
Antimony, Asiatic	15.75c. to 16.25c.
Aluminum, No. 1 ingot for remelting (guaranteed over 99 per cent pure)	29.00c. to 30.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, 1/2 and 1/4	43.00c. to 44.00c.

### Metals from Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	75.50c.
Tin, bar	77.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc slab	8.25c.
Lead, American pig	8.25c.
Antimony, Asiatic	20.50c.
Lead, bar	10.00c.
Babbitt metal, medium grade	20.75c.
Babbitt metal, high grade	29.75c.
Solder, 1/2 and 1/4	43.75c.

### Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

<i>Sheets</i> —	
High brass	17.87 1/2c. to 18.87 1/2c.
Copper, hot rolled	21.50c. to 22.50c.
Copper, cold rolled, 14 oz. and heavier	23.75c. to 24.75c.
<i>Seamless Tubes</i> —	
Brass	22.75c. to 23.75c.
Copper	23.50c. to 24.50c.
<i>Brased Brass Tubes</i>	26.37 1/2c. to 27.37 1/2c.
<i>Brass Rods</i>	15.62 1/2c. to 16.62 1/2c.

### From New York Warehouse

<i>Delivered Prices, Base per Lb.</i>	
Zinc sheets (No. 9), casks	12.75c. to 13.00c.
Zinc sheets, open	13.25c. to 13.50c.

### Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products were advanced again on Feb. 21, and are now quoted at the same level that prevailed at the beginning of the month. Zinc sheets and lead full sheets are still holding at the reductions of Jan. 10 and 24 respectively.

#### List Prices per Lb., f.o.b. Mill

*On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over*

##### *Sheets*—

High brass	18.12 1/2c.
Copper, hot rolled	21.75c.

Zinc	11.00c.
Lead (full sheets)	11.00c. to 11.25c.

##### *Seamless Tubes*—

High brass	22.00c.
Copper	23.75c.

##### *Rods*—

High brass	15.87 1/2c.
Naval brass	18.62 1/2c.

##### *Wire*—

Copper	15.12 1/2c.
High brass	18.62 1/2c.

Copper in Rolls	20.62 1/2c.
Brazed Brass Tubing	26.12 1/2c.

#### Aluminum Products in Ten Lots

*The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.*

Sheets, 0 to 10 gage, 3 to 30 in. wide	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

**Rolled Metals, f.o.b. Chicago Warehouse**

(Prices Cover Trucking to Customers' Doors in City Limits)	
	Base per Lb.
<i>Sheets—</i>	
High brass	17 1/4c.
Copper, hot rolled	21.50c.
Copper, cold rolled, 14 oz. and heavier	23.75c.
Zinc	12.00c.
Lead, wide	10.25c.
<i>Seamless Tubes—</i>	
Brass	22.75c.
Copper	23.50c.
<i>Brazed Brass Tubes</i>	25 1/2c.
<i>Brass Rods</i>	15 1/2c.

35c. with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is quoted at 26c. per lb. delivered.

**Non-Ferrous Metals at Chicago**

FEB. 21.—Prices of copper, tin and lead have advanced in a market that is fairly steady. Antimony is weaker. Old metals are quiet and show less activity than a week ago.

We quote in carload lots: Lake copper, 13.12 1/2c.; tin, 69.50c.; lead, 7.30c.; zinc, 6.70c.; in less than carload lots, antimony, 14c. On old metals we quote copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 7.25c.; lead pipe, 6.25c.; zinc, 4.25c.; pewter, No. 1, 35c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 15c.; all being dealers' prices for less than carload lots.

**Chicago Iron and Steel Market**

(Concluded from page 603)

11,000 tons of 24, 36, 42 and 48-in. pipe with the United States Cast Iron Pipe & Foundry Co. The delivered price, which includes a distribution cost of about 60c. a ton, was \$44.55. The freight rate to Chicago is \$8.20. After deducting these charges the base price figures \$5.75, Birmingham. Barberton, Ohio, opened bids Feb. 18 on 800 tons of 4 to 16-in. Classes B and C pipe, and Dayton, Ohio, will receive tenders Feb. 24 on 960 tons of 4 to 10-in. Class B pipe. The National Cast Iron Pipe Co. has taken 1800 tons of 6 to 16-in. pipe for Specialville, Ill.

We quote per net ton, delivered, Chicago, as follows: Water pipe, 4-in., \$47.70 to \$49.20; 6-in. and over, \$43.70 to \$45.20; Class A and gas pipe, \$4 extra.

**Cold-Rolled Strip.**—There is a disposition on the part of sellers to try to get better prices. Fewer sales are being made now at 3.15c., delivered, Chicago. One large seller claims to be holding to 3.30c., Chicago, as the minimum.

**Coke.**—Some users of by-product foundry coke are inclined to view with concern the threat of a coal strike. Producers have taken note of this and are making an effort to influence buyers to take only their requirements for the immediate future. Chicago district ovens are operating at full capacity and shipments are steady. Spot sales are light at 50c. above the contract prices of \$9.75, district ovens, or \$10.25, delivered in the Chicago switching district.

Domestic sales in January of oak leather belting, as reported by the Leather Belting Exchange, were 298,764 lb., valued at \$499,534, or an average of \$1.67 per lb. This is a gain over December, when the total was 285,847 lb., valued at \$471,076, or an average of \$1.65 per lb. It was considerably lower, however, than the sales in January, 1926, of 370,678 lb., valued at \$628,679, or an average of \$1.72 per lb.

The Ames Shovel Co., Anderson, Ind., manufacturer of shovels, expects to begin operation of its new rolling mill addition about March 1. Progress is being made on the addition to the company's forging plant.

**Old Metals, Per Pound, New York**

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.00c.	12.50c.
Copper, heavy and wire	10.75c.	11.75c.
Copper, light and bottoms	9.00c.	10.50c.
Brass, heavy	6.75c.	8.25c.
Brass, light	5.75c.	7.25c.
Heavy machine composition	8.25c.	9.75c.
No. 1 yellow brass turnings	7.75c.	8.50c.
No. 1 red brass or composition turnings	7.75c.	8.75c.
Lead, heavy	6.25c.	6.75c.
Lead, tea	4.25c.	5.00c.
Zinc	3.75c.	4.25c.
Sheet aluminum	15.00c.	17.00c.
Cast aluminum	15.00c.	17.00c.

**RAILROAD EQUIPMENT****Orders for 561 Cars and 21 Locomotives—Inquiries for 24 Engines**

Railroad equipment demand during the past week was very light. The total of cars ordered was 561. Twenty-one locomotives also were bought and 24 are pending. Details of the week's business follow:

Freight cars in need of repair on Feb. 1 totaled 136,847 or 5.9 per cent of the number on line, according to reports filed by the carriers with the Car Service Division of the American Railway Association. This was an increase of 7178 cars over the number reported on Jan. 15. It was, however, a decrease of 21,313 cars compared with the same date last year.

Freight cars in need of heavy repair on Feb. 1 totaled 94,837 or 4.1 per cent, an increase of 221 compared with Jan. 15, while freight cars in need of light repair totaled 42,010 or 1.8 per cent, an increase of 6957 compared with Jan. 15.

Class I railroads on Feb. 1 had 9256 locomotives in need of repairs or 14.9 per cent of the number on line. This was a decrease of 115 compared with the number in need of repair on Jan. 15.

Of the total number of locomotives in need of repair on Feb. 1, 4773 or 7.7 per cent were in need of classified repairs, a decrease of 224 compared with Jan. 15, while 4483 or 7.2 per cent were in need of running repairs, an increase of 109 compared with the number in need of such repairs on Jan. 15.

Serviceable locomotives in storage on Feb. 1 totaled 4666 compared with 4600 on Jan. 15.

The Inland Steel Co. has ordered 1 6-wheel switching locomotive from the Baldwin Locomotive Works.

The Duluth, Missabe & Northern is in the market for 4 10-wheel switching locomotives.

The Chicago & North Western is inquiring for 8 8-wheel switching locomotives and 12 2-8-4 type locomotives.

The Denver & Rio Grande Western has ordered 10 Mallet type locomotives from the American Locomotive Co.

The Rodger Ballast Car Co. has placed 301 ballast cars with the American Car & Foundry Co.

The Denver & Rio Grande Western has ordered 10 locomotives from the American Locomotive Co.

The Western Pacific has placed 100 ballast cars with the Rodger Ballast Car Co.

The Cities Service Tank Line has awarded 50 tank cars to the General American Tank Car Corporation.

The Missouri Pacific has purchased 100 ballast cars from the Rodger Ballast Car Co.

The Atchison, Topeka & Santa Fe has placed 20 chair cars with the Pullman Car & Mfg. Corporation.

The Mid-Continent Coal Co. has purchased 10 gondola cars from the American Car & Foundry Co.

## INCOME NINETY BILLIONS

Increase of 44 Per Cent Since 1921—Buying Power Greater Than Ever Before

CURRENT income of the American people rose from \$62,736,000,000 in 1921 to the record-breaking total of \$89,682,000,000 in 1926. These figures are from a bulletin of the National Bureau of Economic Research, 474 West Twenty-fourth Street, New York. That the growth of 44 per cent did not result from an increase in the price level is shown by the fact that the average

Table I.—Growth of National Income

	Current Dollars	Equivalent Dollars		Current Dollars	Equivalent Dollars
1909...	27,100	28,200	1918...	56,000	35,500
1910...	28,400	29,100	1919...	67,254	37,600
1911...	29,000	29,300	1920...	74,158	36,300
1912...	30,600	30,800	1921...	62,736	36,200
1913...	32,000	32,000	1922...	65,567	40,400
1914...	31,600	31,300	1923...	76,769	46,900
1915...	32,700	32,000	1924...	79,365	48,400
1916...	39,200	35,500	1925...	86,461	51,100
1917...	48,500	37,300	1926...	89,682	52,900

price of consumption goods was slightly less in 1926 than in 1921.

For the 44,600,000 persons engaged in gainful activities there was an average income of \$2,010 in 1926. This compares with \$1,537 in 1921 and with \$864 in 1913. Reduced to the basis of 1913, so far as purchasing power is concerned, the \$864 income in 1913 advanced to the equivalent of \$887 in 1921 and \$1,186 in

Table II.—Income Per Capita in the United States

	Average Per Inhabitant		Average Per Person Gainfully Employed	
	Actual Income	Equivalent Income	Actual Income	Equivalent Income
1909....	\$299	\$312	\$791	\$823
1910....	307	315	809	829
1911....	309	312	812	821
1912....	321	323	844	850
1913....	329	329	864	864
1914....	320	316	836	828
1915....	326	319	861	843
1916....	385	349	1,014	919
1917....	470	361	1,232	947
1918....	537	340	1,386	879
1919....	640	358	1,669	934
1920....	697	341	1,851	907
1921....	579	334	1,537	887
1922....	597	369	1,586	979
1923....	689	421	1,821	1,113
1924....	700	426	1,840	1,121
1925....	752	445	1,971	1,165
1926....	770	455	2,010	1,186

1926. The latter is the highest for any year on record.

Figures showing the growth of national income for each year from 1909 to 1926 are covered in Table I. This shows the millions of dollars reported, and, in a

second column, the equivalent purchasing power compared with 1913 and based upon the general cost of commodities.

Similar comparison is made, in per capita income and in income per person gainfully occupied, in Table II. This shows under both headings the current dollars of income received by the average person, and the same figure translated into purchasing power on the basis of 1913 dollars.

## Foremanship Courses Increase

A survey of foremanship classes now being conducted in the United States has been completed by the department of manufacture, Chamber of Commerce of the United States, and the results are published in a pamphlet, which reports that the number of such courses has increased several hundred per cent within a year.

Between June, 1925, and June, 1926, the report shows, 324 foremanship courses were conducted, of which 185 were under the auspices of State vocational education departments, 30 were provided by State university extension departments and 109 were conducted by private agencies. The States in which the greatest number of courses were given are Indiana, Iowa, Massachusetts, New York and Ohio, each of these having had upward of 30.

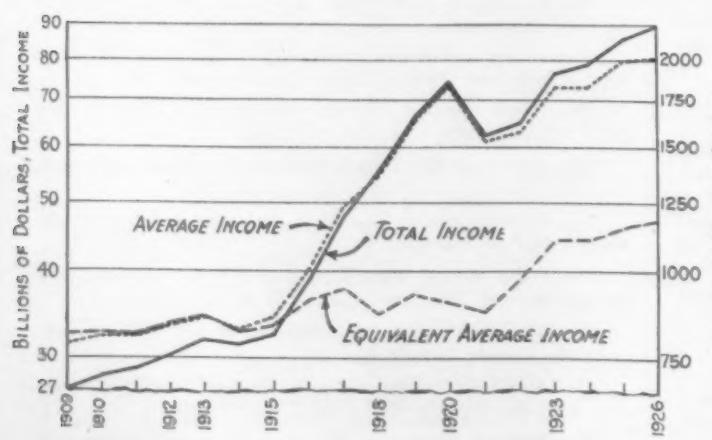
E. W. McCullough, manager of the department of manufactures, Chamber of Commerce of the United States, comments as follows on the results achieved by foremen's training:

"There are reasons for the rapid growth and permanent status of foremanship training. One company finds an increased production with a decreased personnel as the outstanding result which it attributes to better foremanship. Another finds, through better cooperation on the part of the foreman, a considerably reduced inventory of material in process; another finds closer cooperation between the foremen and the inspectors; another, less labor turnover due to more intelligent handling of the human element; still another, better employer-employee relations throughout; and thus we might quote many other experiences given to us in letters."

## Water-Power Plant Capacity

Total capacity of water-wheels in water-power plants in the United States was 11,721,000 hp. on Jan. 1, according to the Geological Survey. This represents an increase of 544,000 hp. in one year. The increase was less than that in the three preceding years, but otherwise greater than in any year since 1913. The total capacity has trebled since Jan. 1, 1910.

Total capacity of stationary prime movers is estimated by the Bureau of the Census at 56,500,000 hp. of which water-wheels constitute 20.7 per cent. Of the 30,500,000 hp. of all stationary prime movers on Jan. 1, 1910, water-wheels constituted only 17.7 per cent.



**TOTAL** Income of the American People Has Gone Up from 27 Billions in 1909 to 90 Billions in 1926, as Shown by Solid Line. Average income of those gainfully employed has, in the same period, advanced from \$791 to \$2,010. This increase of 154 per cent was due in large measure to a general rise in price levels. Eliminating this influence, the equivalent income, on the basis of 1913 dollars and cost of living, has risen from \$823 in 1909 to \$1,186 in 1926. Thus purchasing power of the average individual has advanced 44 per cent.

## PERSONAL

Mason P. Rumney, vice-president and director of the Detroit Steel Products Co., with which he has been connected since 1908, has been elected president of the Detroit Railway & Harbor Terminals Co. William J. Hogan, heretofore president who is also president of the National Terminals Corporation, which operates the Detroit Railway & Harbor Terminals property in conjunction with a chain of terminal warehouses in Chicago, Cleveland, Indianapolis and Cincinnati, was made chairman of the board.

While Mr. Rumney will devote his entire time to the Detroit Railway & Harbor Terminals Co., he will continue his connection with the Detroit Steel Products Co., with which he has been successively salesman, superintendent, works manager and vice-president.

During the war he was in the office of Chief of Ordnance, with the rank of major, in charge of national production and overseas shipment of artillery vehicles. He is a director of the Morris Plan Bank of Detroit, member of the American Society for Treating Materials, of the American Society of Steel Treaters and of the Society of Automotive Engineers, in which he served two years as a member of the council.

D. L. Mathias recently resigned as editor *Forging-Stamping-Heat Treating* and *The Blast Furnace and Steel Plant* to become associated again with the Mackintosh-Hemphill Co., Pittsburgh, as metallurgical engineer. In addition to his duties in that capacity, Mr. Mathias will have charge of publicity and advertising. He was graduated from the Carnegie Institute of Technology in 1914 and soon afterward joined the Mackintosh-Hemphill Co., as metallurgical engineer, remaining with the company until 1920, when he went with the Brown Instrument Co., Philadelphia, as pyrometer engineer. In 1922 he took up his recent editorial work.

John E. Galvin, president Ohio Steel Foundry Co., Lima, Ohio, has been elected president of the Lima Manufacturers' Association. L. A. Larsen, vice-president and treasurer Lima Locomotive Works, has been named secretary and treasurer, and E. N. Pierce, secretary and assistant treasurer Lima Locomotive Works, is to serve as assistant secretary and treasurer.

E. W. Buschman, general sales manager Foster Machine Co., Elkhart, Ind., has resigned, effective March 1. He has not announced future plans.

R. H. Bourne, formerly vice-president and sales manager of the Whiting Corporation, Harvey, Ill., has been made senior vice-president of the company and will devote a large part of his time to the sales management of the Grindle Fuel Equipment Co. and the Joseph Harrington Co., subsidiaries of the Whiting organization. N. S. Lawrence, formerly vice-president and assistant sales manager for the parent company, is now vice-president and sales manager of that company and also of the Swenson Evaporator Co. He will be assisted by A. H. McDougall, vice-president



MASON P. RUMNEY

and consulting engineer, and E. H. Prussing, vice-president in charge of district offices and agents.

T. C. Pike has been appointed manager of the George W. Grimes Foundry, Buffton, Ind.

R. E. MacCartney, during the last year special factory representative in the Chicago district for the Gisholt Machine Co., Madison, Wis., has been placed in charge of that company's office recently opened at 722 West Washington Boulevard, Chicago. E. B. Verner, employed for several years at the home office, will assist Mr. MacCartney.

W. C. Stettinius, president American Hammered Piston Ring Co., Baltimore, has been made a member of the merchandising committee of the Automotive Equipment Association, to succeed T. H. Quinn of the National Lamp Works, General Electric Co., who has resigned. Mr. Stettinius is president of the National Standard Parts Association and has served in the past on the service parts committee of the Automotive Equipment Association.

Archibald H. Ehle has been made vice-president in charge of domestic sales for the Baldwin Locomotive Works, Philadelphia, succeeding the late Grafton Greenough. Alva C. Dinkey, president of the Midvale Co., Nicetown, Philadelphia, and Francis M. Weld, of White, Weld & Co., New York, have been elected to the board of directors.

John Alden Plimpton, for some time sales engineer in the Pittsburgh office of the Pennsylvania Crusher Co., Philadelphia, has been made Western manager for the company with headquarters in the Illinois Merchants Bank Building, Chicago. He succeeds C. S. Darling, who has taken up association work.

Severn P. Ker, president of the Sharon Steel Hoop Co., Sharon, Pa., was the speaker at the annual dinner of the Iron and Steel Club of Detroit, held recently at the Detroit Athletic Club. His subject was "The Growth of the Steel Industry." The club is made up of district managers of steel companies maintaining offices in Detroit, and has just elected the following officers and directors for 1927: Earl Park, Superior Steel Corporation, president; T. H. Booth, Columbia Steel & Shafting Co., vice-president; Harold Davey, Mansfield Sheet & Tin Plate Co., secretary-treasurer, and W. J. Hanna, Trumbull Steel Co.; A. A. Keally, Sharon Steel Hoop Co.; H. B. MacGregor, Newton Steel Co., and E. D. Pumphrey, Donner Steel Co., directors.

Fred Hughes Moyer, recently elected vice-president of the Mackintosh-Hemphill Co., Pittsburgh, was made a director of the company at the annual meeting of stockholders on Feb. 15. Other new directors named were Samuel McMillen, for many years the company's general superintendent; E. H. Haslam, at one time chief engineer and more recently vice-president and general manager; W. C. Rice, formerly connected with the Pittsburgh Iron & Steel Foundry Co., Midland, Pa., now the Midland plant of the Mackintosh-Hemphill Co., and John W. Chalfant, Colonial Trust Co., Pittsburgh. J. R. Speer continues as president of the company, and Donald H. Baum as secretary-treasurer. They, together with H. V. Blaxter and Charles McKnight, were reelected directors.

W. S. Rennie, formerly New York representative Dannemora Steel Co., is now New York metropolitan representative for the Cyclops Steel Co., Titusville, Pa., with offices in the Longacre Building, 1476 Broadway, New York.

F. A. Parker, associated for 12 years with Hill, Clarke & Co., Boston, now represents the Jones & Lamson Machine Co., Springfield, Vt., in the New York and New Jersey territory.

H. E. White has been appointed works manager of

the Truscon Steel Co., Youngstown. He has been serving in that capacity since the death of T. H. Kane.

D. W. Kerr, formerly general sales manager Trumbull Steel Co., Warren, Ohio, and subsequently president and manager of the American Zinc Products Co., Greencastle, Ind., has organized the Niles Corrugating Co. which will manufacture various metal products in a plant recently acquired on Butler Street, Niles, Ohio.

### Blast Furnace and Coke Oven Association Meeting

The winter meeting of the Eastern States Blast Furnace and Coke Oven Association, to be held at the William Penn Hotel, Pittsburgh, Friday, March 4, will be an all day gathering, with technical sessions in the morning and afternoon and concluding with a dinner in the evening. "The Economical Use of Fuel in the Steel Industry" is the subject of a paper to be presented by H. A. Brassert, Chicago, while P. J. Freeman, chief engineer Allegheny County Bureau of Tests and Specifications, will have a paper on "The Use of Blast Furnace Slag as an Aggregate," and A. M. Beebee, superintendent gas manufacture, Rochester Gas & Electric Corporation, Rochester, N. Y., has for his subject "Dry Quenching of Coke."

### More Steel Barrels Made

WASHINGTON, Feb. 17.—Steel barrels to the number of 6,588,535 were produced in 1926, according to reports to the Department of Commerce from 31 companies, as against 6,046,654 in 1925 and 4,725,604 in 1924. Except for October, every month in 1926 exceeded, in production, the corresponding month in 1925. The peak month came in June, with 626,812 barrels.

Production in December totaled 539,805 barrels (the largest since July), against 510,489 in November. Stocks on hand at the end of December represented 47,790 barrels, as against 54,377 on the first of the month. Shipments in December were close to production, at 546,392 barrels. Unfilled orders at the end of December for delivery within 30 days represented 349,491 barrels, while the number for delivery beyond 30 days was 1,496,496.

Members of the Steel Barrel Manufacturers' Association, Cleveland, report a December business amounting to \$1,304,523. The number of barrels shipped aggregated 403,657, of which all but 171 were for domestic use. As usual, New Jersey led with 117,986 barrels. Indiana took about half that number, with Pennsylvania and New York in third and fourth positions. Of the daily capacity of the members, 51.6 per cent was used during the month. For light barrels, 57.6 per cent of the capacity was in use; for I. C. C. barrels, 29.8 per cent.

Shipments in 1926 of the manufacturers forming the membership of the Steel Barrel Manufacturers Association aggregated 4,786,105. Less than 1 per cent went out of the United States, the total export list, including Canada, having been only 5274. Shipments to the States receiving the largest number of barrels were as follows:

New Jersey...	1,310,888	Illinois .....	297,449
New York...	659,765	California ....	214,003
Pennsylvania.	657,881	Ohio .....	182,134
Texas .....	319,431	Kansas .....	157,942
Indiana .....	305,086	Michigan .....	74,551

Of the average daily productive capacity, 48.5 per cent was used through the year. Only 33.6 per cent of the capacity for I. C. C. barrels was used, together with 53.5 per cent of the capacity for light barrels. The volume of business for the year is reported at \$15,766,526, or an average of \$3.29 per barrel.

Electric precipitation of ash in a powdered fuel boiler plant is to be done by the Detroit Edison Co. The Cottrell process is being used, with 25-kva. General Electric transformers supplying current at 75,000 volts. The object is to remove fine ash from the smoke.

### OBITUARY

CHARLES E. SHADALL, one of the founders of the Nordberg Mfg. Co., Milwaukee, died Feb. 10. He was born in Finland and was graduated from the University of Helsingfors in 1879. He came to Milwaukee in 1883.

LIEUT. COL. WILLIAM MITCHELL LEWIS, pioneer automobile manufacturer of Racine, Wis., died at his winter home in Daytona Beach, Fla., on Feb. 14, aged 58 years. He was a graduate of Yale University and was president of the Mitchell-Lewis Motor Co., Racine, the outgrowth of the Mitchell & Lewis Co., wagon works, founded by his father, until the business was purchased by eastern capital in 1920.

JUSTUS H. SCHWACKE, until recently president William Sellers & Co., Inc., Philadelphia, died Feb. 17 at Boca Grande, Fla., aged 79 years. He became associated with the Sellers organization in 1862 and was elected secretary when the company was incorporated in 1886. He was made a director in 1902 and three years later became manager of the company. He served as president from 1922 until May 31, 1926, having retired to private life on the later date. Mr. Schwacke was active in the formation of the National Metal Trades Association and served as president in 1910 and 1911. He was also a member of the National Founders Association, and was for several years president of the Metal Manufacturers Association of Philadelphia. He was an honorary member of the latter organization and also an honorary member of the administrative council of the National Metal Trades Association.

JOSEPH BURNS, vice-president of the Burns Tool Co., Okmulgee, Okla., died on Feb. 2.

RUSSELL ROBB, since 1920 senior vice-president, treasurer and a director of Stone & Webster, Inc., Boston, died Feb. 15 at his home in Concord, Mass. He was born at Dubuque, Iowa, in 1864, and was graduated from the Massachusetts Institute of Technology in 1888. Following three years with the Thomson Electric Welding Co. he became associated with Stone & Webster, and in 1905 was admitted to the firm. He was a lecturer at Harvard University in 1909-11, and was the author of a number of books and articles dealing with the electrical industry and its business organization.

WILLIAM H. ROBERTS, president of the Roberts Brass Mfg. Co. and the Detroit Stamping Co., both of Detroit, died suddenly in that city on Feb. 14. He was born at Wallaceburg, Ont., 48 years ago, but soon removed to Detroit with his parents. When a young man he became associated with his father, D. H. Roberts, who was the founder of the company bearing the name, and had spent his business life with the firm.

LOUIS HANSSEN, president and treasurer of Louis Hanssen's Sons, Davenport, Iowa, wholesale dealers in hardware, factory and mill supplies, died suddenly Feb. 13 at his home in that city, aged 63 years. He was born at Davenport, and became associated with his father in the hardware business in 1895. Upon the retirement of the latter two years later he joined his brothers in the incorporation of the firm under its present name, and had been prominently identified with the company since that time.

E. J. BRADDOCK, president Braddock Nail & Mfg. Co., Cleveland, died Feb. 15, aged 77 years.

J. E. HIGGINS, secretary A. Plamondon Mfg. Co., Chicago, machinist and founder, died suddenly on Feb. 11. He was 56 years of age and had served the company for 42 years.

# Machinery Markets and News of the Works

## RAILROAD LIST OF 43 TOOLS

### Baltimore & Ohio Issues Larger Inquiry —General Business Not Improved

#### Increased Interest Is Shown by Some of the Automobile Manufacturers and Orders Are Placed

THE Baltimore & Ohio Railroad has issued an inquiry for 43 machine tools, the largest railroad inquiry of the year so far. Other railroad inquiries are expected shortly. The Chicago & Eastern Illinois has a sizable machine tool list in preparation and has pur-

chased several items of equipment for its car shop. The Boston & Maine has purchased a side-head boring mill, the New York Central has taken two engine lathes in addition to four bought recently, and the Missouri Pacific is reported to be inquiring for four lathes.

Automobile makers are showing more interest in new shop equipment, and orders of the week from this source include 12 lathes for delivery to one Detroit company and nine to another. Plants engaged in making automobile parts are busier than last month.

There is a good deal of caution among prospective buyers of machine tools in the general industrial field, but the week has brought a fair amount of business in some districts. Orders are widely scattered and usually are for single machines.

## New York

NEW YORK, Feb. 21.

MACHINE tool business is in about the same volume as in recent weeks. Purchases are made up mostly of single tools. Inquiries are in fair number, but prospective buyers continue their policy of caution. Among the orders of the past week are the following: Surface grinding machine to a Cleveland company; vertical shaper to a manufacturer at Claremont, N. H.; vertical shaper to a Worcester, Mass., company; automatic lathe and a centering machine to a St. Louis company; jig boring machine to a Rochester, N. Y., company; two bench lathes to a Connecticut clock manufacturer; a geared-head lathe to a New Britain, Conn., manufacturer; a jig boring machine for shipment to Detroit; a side-head boring mill to the Boston & Maine Railroad; a 200-ton wheel press to the American Steel & Wire Co., and a 600-lb. steam hammer to a Chicago company.

The Prest-O-Lite Co., 30 East Forty-second Street, New York, manufacturer of acetylene welding apparatus, etc., is reported to be planning the construction of a new plant at North Birmingham, to cost in excess of \$75,000 with equipment.

The Stewart Automobile School, 225-27 West Fifty-seventh Street, New York, has acquired property, 75 x 100 ft., at 233-57 West Sixty-fourth Street, as site for the erection of a new seven-story service and instruction building, with shops for repair and parts work, etc., to cost more than \$200,000. The Stewart company will occupy four floors of the structure and will remove to this location. J. M. Felson, 250 West Fifty-seventh Street, is architect.

Fire, Feb. 10, damaged a portion of the machinery and stock at the plant of the Eastern Steel Bed Co., 216-26 Dumont Avenue, Brooklyn.

D. J. Cohan, 47 West Forty-second Street, New York, architect, has plans for a two-story automobile service, repair and garage building, 100 x 200 ft., at Long Island City, to cost \$125,000 with equipment.

The Brooklyn Edison Co., Pearl and Willoughby Streets, Brooklyn, is arranging for an increase in capital from \$75,000,000 to \$100,000,000, a portion of the fund to be used for extensions and improvements. Matthew S. Sloan is president.

The Orteig Motor Co., 227 West Sixty-first Street, New York, has arranged for a new seven-story service, repair and garage building, 100 x 200 ft., on adjoining site, to cost more than \$200,000. Frank Parker, 280 Madison Avenue, New York, is architect and engineer.

The Automatic Movie Display Corporation, 130 West Forty-sixth Street, New York, recently formed under Delaware laws with capital of 300,000 shares of stock, no par

value, plans the operation of a factory at Milwaukee for the manufacture of an automatic motion picture machine to be known as the Vitalux, including parts production and assembling department. John R. Freuler, chairman of the Motion Picture Board of Trade during the World War, will be president of the new company.

The Board of Education, 145 Highland Avenue, Middletown, N. Y., L. H. Prince, in charge, contemplates the installation of manual training equipment in the proposed addition to the high school, to cost \$300,000. D. H. Canfield, 11 Linden Place, is architect; H. R. Graham, 25 Prospect Street, is engineer.

The New York Steam Corporation, 280 Madison Avenue, New York, operating power plants for central station service, has disposed of a bond issue of \$2,000,000, a portion of the fund to be used for expansion and improvements.

The Hudson Gas Appliance Co., 920 Hackensack Plank Road, North Bergen, N. J., manufacturer of gas-operating equipment, has asked bids on a general contract for a one-story addition, 45 x 100 ft., to cost close to \$40,000 with equipment.

Smith & Dunne, Inc., Produce Road South, Kearny, N. J., manufacturer of chemicals, has acquired the property of the Aircraft Fireproofing Corporation, Nutley, N. J., consisting of 6 1/2 acres, improved with a three-story factory and four-story buildings, totaling more than 35,000 sq. ft. of floor space. The new owner will remodel for a steel drum and carboy plant, with major portion to be given over to assembling work.

The American Lead Pencil Co., 500 Willow Avenue, Hoboken, N. J., has awarded a general contract to the Turner Construction Co., 244 Madison Avenue, New York, for a new seven-story factory, 75 x 100 ft., to cost more than \$225,000 with equipment. Fred Small, 24 West Thirtieth Street, New York, is architect.

Otto S. Sehlich, 186 Liberty Street, New York, architect, will soon take bids for a three-story automobile service, repair and garage building, 100 x 150 ft., at Teaneck, N. J., to cost about \$150,000 with equipment.

The Servel Corporation, 51 East Forty-second Street, New York, manufacturer of electric refrigerating equipment, has arranged for an increase in capital from \$100,000,000 to \$130,000,000, a portion of the fund to be used for expansion.

The Automatic Selecting Mfg. Co., Inc., 89 Grand Street, Brooklyn, has been organized to manufacture specialties and will be in the market for sheets, round and square shaped steel, brass castings, aluminum and various machinery, tools and material. The company desires catalogs covering these types of equipment and material.

The New York Engineering Co., for a number of years at 2 Rector Street, New York, has removed its offices to the New York Evening Post Building, 75 West Street, New York.

The Fireplace Equipment Co., Inc., 251 East 133rd Street, New York, has been organized to manufacture fireplace

screens, andirons and kindred equipment. No building program is planned at present. D. W. Henry is president of the company; E. B. Bennett, vice-president, and Charles Bennett, secretary and treasurer.

The Dural Corporation, 427 West Forty-second Street, New York, has been organized with a capital of 500 shares of no par value stock to operate a metal plating works at the above address. The company is operating under a license issued by the Chromium Corporation of America, 120 Broadway, New York, and will specialize in chromium plating of various types.

The Carroll Chain Co., Columbus, Ohio, will open a New York district sales office on March 1 at 30 Church Street, in charge of Hendricks & Class.

The Hendrick Hudson Garage, Inc., Troy, N. Y., has plans nearing completion for a four-story and basement service, repair and garage building, 100 x 137 ft., to cost about \$130,000. G. S. Thompson, 257 Broadway, is architect.

The Department of Water Supply, Gas and Electricity, Municipal Building, New York, plans the early erection of a one-story repair shop at Long Island City, reported to cost more than \$70,000 with equipment.

The Essex County Board of Vocational Education, 969 Broad Street, Newark, N. J., has acquired property at Bloomfield as a site for a new boys' vocational school to replace a structure at West Orange recently destroyed by fire. It will cost in excess of \$400,000 with equipment.

The Public Service Electric & Gas Co., Public Service Terminal, Newark, N. J., will issue bonds totalling \$1,136,000, a portion of the proceeds to be used for extensions and improvements in power plants and system.

## New England

BOSTON, Feb. 21.

**B**USINESS in the local machine tool market is still confined to a few single machines, mostly small. Lathes, drilling machines and small grinding tools led in activity the past week, with approximately 80 per cent bought by Massachusetts shops, the remainder going to Rhode Island, Vermont and Connecticut companies. The important users of machine tools who contemplate purchasing apparently are no nearer placing orders than they were a week ago. It is reported that buying has been deferred owing to a temporary lull in business. New inquiries are coming in slowly, and in all instances involve single machines. Small tools are in good demand, cutting off tools being especially active. Grinding machine parts also are in good call.

The city of Warren, R. I., will build a high and junior high school with manual training department. H. De Wolf, South Main Street, is chairman of the building committee.

The Wakefield Wrench Co. and the Haughton Stamped Metal Co., 89 Exchange Street, Worcester, Mass., suffered considerable damage from fire last week and will require new equipment.

The New England Portland Cement & Lime Co., Rockland, Me., has been purchased by the Lawrence Portland Cement Co., Siegfried, Pa., which will make extensive improvements, including a waste heat plant, and will require electrical and conveying equipment.

A preliminary certificate of dissolution has been filed by the Connecticut Belting Co., Norwich, Conn. Claims may be sent to Stanley M. Kingsbury, P. O. Box No. 34, Norwich.

The Glenwood Range Co., West Water and Fifth Streets, Taunton, Mass., has started a one-story, 147 x 150 ft. plant addition. Plans are private.

The Lawrence Machine Co., Market Street, Lawrence, Mass., has tentative plans for a new plant and equipment to replace one destroyed by fire last week.

The Pratt & Whitney Aircraft Co., Hartford, Conn., has tentative plans for doubling its machine shop space and other manufacturing facilities. It has taken an order for 25 400-hp. engines for mail planes and has other work which makes expansion necessary.

The New England Radiator Works, Providence, R. I., has asked bids on revised plans for a new one- and two-story plant, to cost about \$45,000. Bids recently received have been rejected.

The Eastern Nail Co., Inc., 176 Union Avenue, Providence, R. I., has acquired the plant and business of the Tremont Nail Co., Wareham, Mass., manufacturer of hardened cut-steel nails, etc. The new owner will continue production and is considering plans for early advance in output.

The Bridgeport Brass Co., Bridgeport, Conn., is arranging for expansion in connection with the manufacture of a recently perfected foot-controlled flush valve, to be carried out in its brass goods bathroom fixture division.

Oliva Saulnier, 12 Scott Street, New Bedford, Mass., architect, has plans under way for a new two-story automobile service, repair and garage building, 80 x 200 ft., to cost about \$115,000 with equipment.

The Aeolian Co., Fifth Avenue and Fifty-fourth Street, New York, manufacturer of player pianos, player mechanisms, etc., has awarded a general contract to the Aberthaw Construction Co., Boston, for a five-story addition to its plant at Neponset, Mass., to cost \$150,000.

The Torrington Co., Torrington, Conn., manufacturer of steel needles and kindred specialties, will discontinue operations at its Manchester, N. H., plant, and plans the early removal of the machinery to its main works at Torrington, where operations will be concentrated.

The Northern Steel Co., 44 School Street, Boston, is putting up a 118-ft. extension to the main building of its Gibson Street plant, Medford, Mass., and will soon close contracts for additional shearing and straightening machines.

## Chicago

CHICAGO, Feb. 21.

**S**ALES and inquiries for machine tools are marking time. Orders are widely scattered and are usually taken on inquiry that has been before the trade for some time. The Chicago & Eastern Illinois has purchased several car shop items and is said to have in preparation a sizable machine tool program for 1927. The miscellaneous tools asked for by the St. Paul Railroad are active, and the Santa Fe is in the market for a 25-lb. hammer. The International Harvester Co. has bought two lathes and is inquiring for several small drill presses. The trade is hoping that the Illinois Steel Co.'s list will be placed earlier than reports indicated last week. It has asked for further information on three items and has changed specifications on a fourth.

The Creamery Package Mfg. Co., 1243 West Washington Boulevard, Chicago, manufacturer of dairy machinery, is said to be planning extensions and improvements in its branch plant at Omaha, Neb., to cost about \$50,000 with equipment. George Walker is secretary and treasurer.

The Board of Education, City Hall, Minneapolis, Minn., will begin work in the fall on the first unit of a proposed five-story and basement vocational school, estimated to cost \$450,000. A second unit of about like size will be built following completion of the first building. The Bureau of Buildings, Division of Design and Inspection, 245 Ninth Avenue, North, is architect and engineer for the work.

L. E. Russell, 140 South Dearborn Street, Chicago, architect, is preparing plans for a two-story automobile service, repair and garage building, to cost \$100,000 with equipment.

R. G. Regan, 2322 Milwaukee Avenue, Chicago, has filed plans for a one-story machine shop, 45 x 125 ft., to cost \$35,000.

The Ahlberg Bearing Co., 321 East Twenty-ninth Street, McHenry, Ill., and 2715 South Michigan Avenue, Chicago, is contemplating the erection of a new one-story plant at McHenry, 400 x 450 ft., to cost in excess of \$100,000. It is understood that work will begin in the fall.

The Standard Oil Co., Austin, Minn., is planning the construction of a new oil storage and distributing plant, to cost about \$80,000 with equipment.

The Northern Pacific Railroad Co., Railroad Building, St. Paul, Minn., has plans under way for a proposed steam-operated electric power plant at Mandan, N. Dak., to cost about \$100,000, on which work will begin during the summer. O. M. Rognan is company architect.

Fox & Fox, 38 South Dearborn Street, Chicago, architects, have filed plans for a five-story automobile service, repair and garage building, 100 x 150 ft., to cost about \$300,000 with equipment.

The G. & W. Electric Specialty Co., 7780 Dante Avenue, Chicago, has awarded a general contract to the Austin Co. for a one-story addition, 75 x 320 ft., to cost about \$75,000 with equipment.

The Meadows Mfg. Co., Bloomington, Ill., manufacturer of electric-operated washing machines, etc., is said to be planning the erection of a one-story addition, to cost \$50,000 with machinery.

## The Crane Market

THE number of active inquiries for electric overhead cranes is increasing, and it is estimated that there are between 30 and 40 different requests for prices under consideration in the New York district. Most of these inquiries are for single cranes, but a few are for two or more. In the Cincinnati district, Paul Stewart & Co., Cincinnati, are in the market for a 25-ton, 50-ft. span, used overhead crane. Inquiry for locomotive cranes continues fair, but with the exception of the recent purchase of four locomotive cranes and three dippers by the Norfolk & Western, railroad inquiry has not yet developed.

Among recent purchases are:

Stone & Webster, Inc., Boston, a 33 to 40-ton locomotive crane with outriggers, for Conowingo, Md., from the American Hoist & Derrick Co.

H. Weiner & Co., Pottsville, Pa., a used 20-ton locomotive crane, from a local dealer.

National Radiator Co., a 7½-ton, 60-ft. span electric overhead crane for Trenton, N. J., from the Shaw Electric Crane Co., and a 5-ton, 60-ft. span, one double-end transfer crane and a 5-ton transfer bucket crane for New Castle, Pa., from the Milwaukee Electric Crane & Mfg. Corporation.

John F. Casey Co., Aspinwall, Pa., a 10-ton overhead crane from the Northern Engineering Works.

## Buffalo

BUFFALO, Feb. 21.

BIDS will be asked in about 30 days by the White Motor Co., 1107 West Genesee Street, Syracuse, N. Y., with main plant at Cleveland, for a two-story factory branch, service and repair building to cost about \$175,000 with equipment. R. C. Purcell is local manager.

The State Hospital Commission, Albany, N. Y., contemplates the construction of a refrigerating and cold storage plant at the State Hospital, Binghamton, N. Y., to cost in excess of \$50,000. Sullivan W. Jones, Capitol Building, Albany, is architect.

The Nash Sales Co., 709 West Genesee Street, Syracuse, has awarded a general contract to the J. D. Taylor Construction Co., 115 South Salina Street, for a two-story and basement service, repair and garage building, 130 x 265 ft., to cost \$115,000 with equipment. Melvin L. King, Dennison Building, Syracuse, is architect.

The New York Department of Mental Hygiene, Capitol Building, Albany, is asking bids until March 9 for a water supply system at the State homeopathic hospital, Gowanda, to cost in excess of \$320,000 with filtration machinery, etc. Plans at the office of the superintendent of public works, division of engineering, 353 Broadway, Albany, and at the office of the division engineer, department of public works, Terminal Building, foot of West Genesee Street, Buffalo.

The Board of Education, Mexico, N. Y., is said to be planning the installation of manual training equipment in its proposed two-story and basement high school, to cost \$185,000. H. O. Fullerton, City National Bank Building, Cleveland, is architect.

The Brown Instrument Co., Philadelphia, has opened a branch office at 794 Ellicott Square Building, Buffalo. D. C. Mayne is district manager.

## Philadelphia

PHILADELPHIA, Feb. 21.

THE General Baking Co., 342 Madison Avenue, has engaged C. B. Comstock, 110 West Fortieth Street, New York, architect, to prepare plans for a six-story plant at Philadelphia, where six acres recently was acquired. It will cost more than \$750,000 with machinery.

The Philadelphia Boiler Works, 1737 Filbert Street, Philadelphia, has asked bids on general contract for a three-story plant, to cost in excess of \$60,000 with equipment. Ralph Bencker, Chestnut and Thirteenth Streets, is architect.

The DeVilbiss Mfg. Co., Commercial Trust Building, Philadelphia, manufacturer of spraying equipment, etc., with main plant at Toledo, Ohio, has leased space in a building at Fifteenth and Cherry Streets for a factory branch.

The Reading Co., Reading Terminal, Philadelphia, is said to have plans under way for a new engine house and repair shop at Shamokin, Pa., in connection with yard improvements at that point, estimated to cost \$240,000.

The Heintz Mfg. Co., Front and Olney Streets, Philadelphia, manufacturer of pressed steel automobile bodies, etc., has awarded a general contract to the William F. Newberry Co., Otis Building, for a one-story addition to cost \$14,000.

The American Assembling Machine Co., 63 Park Row, New York, will soon take bids for a new one-story machine shop at East Northampton, Pa., 130 x 155 ft., to cost \$125,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

The Board of Coal Township School Trustees, Shamokin, Pa., plans the installation of manual training equipment in a proposed new high school, for which plans are being

completed, to cost \$300,000. Erection will begin in the spring.

The United States Milk Bottle Cap Co., West Conshohocken, Pa., recently organized by T. W. and L. T. Barrett and associates, has taken over a local building, and will remodel for the manufacture of patented caps for milk bottles. It is purposed to begin production in March. Frank Graber, West Conshohocken, also is interested in the new organization.

Ernest S. Wolf, 18 South Cameron Street, Harrisburg, Pa., is at the head of a project to construct a two-story automobile service, repair and garage building, 75 x 150 ft., to cost \$80,000 with equipment.

The Board of Education, New Castle, Pa., plans the installation of manual training equipment in its proposed three-story and basement junior high school to cost \$550,000, for which plans are being prepared by A. L. Thayer, Greer Building, architect.

The Sunoco Service Corporation, Pear and New York Streets, Trenton, N. J., oil products, has acquired more than 10 acres on the Delaware River front, and contemplates the construction of a new oil storage and distributing plant, to cost close to \$100,000 with equipment. The Sunoco corporation is operated by the Sun Oil Co., Finance Building, Philadelphia.

The Sheldon Axle & Spring Co., Wilkes-Barre, Pa., is in receivership, the Federal Court at Scranton, Pa., having appointed A. B. Dunsmore, Wellsboro, Pa., and E. E. Jones, Wilkes-Barre, receivers. The Bethlehem Steel Co. is one of the largest creditors. The company manufactures bumpers and fenderettes for automobiles.

The Mann Iron & Steel Co., Inc., Norristown, Pa., dealer in iron and steel scrap and stone, has changed its name to the Mann Co., Inc.

## South Atlantic States

BALTIMORE, Feb. 21.

BIDS will be asked soon by the Southern Couch Mfg. Co., 431-37 Colvin Street, Baltimore, for a five-story and basement plant, 82 x 100 ft., to cost approximately \$100,000 with equipment. Stanislaus Russell, 11 East Lexington Street, is architect.

The Great Valley Anthracite Corporation, Calvert Building, Baltimore, has work in progress on a new electric-operated coal-handling, sorting and preparation plant at McCoy, Va. New coal properties will be opened near Bel Springs in the New River district, with installation of power and mining machinery. The entire project will cost in excess of \$500,000. E. C. Searles is president.

The Board of Trustees, Hood College, Frederick, Md., has filed plans for a one-story power house, and automobile service and garage building, to cost about \$50,000.

The Norfolk & Western Railway Co., N. & W. Railway Building, Roanoke, Va., is said to have plans under way for the construction of an emergency locomotive repair shop and yard extensions at Winston-Salem, N. C., to cost more than \$300,000. W. P. Wiltsee, Roanoke, is chief engineer.

R. L. Underwood, Glennville, Ga., is at the head of a project to construct a local ice-manufacturing plant to cost about \$26,000 with equipment. H. B. Davis, Millen, Ga., is interested.

The Board of City Commissioners, Charlotte, N. C., is asking bids until March 9 for equipment for a sewage disposal plant, including motor-driven air compressors, conveying machinery, sludge pressing equipment, etc. William M. Platt, Durham, N. C., is engineer.

The Creech Lumber Co., Sumter, S. C., is completing plans for the early construction of a one-story veneer mill, 42 x 200 ft., to cost more than \$25,000 with machinery.

Lathes and other woodworking tools will be installed. F. B. Creech is president.

The Beaver Products Co., Beaver Road, Buffalo, N. Y., manufacturer of roofing products, has concluded negotiations for the purchase of the plant and business of the Southern Gypsum Co., North Holston, Va., including gypsum rock properties. The new owner will consolidate under the Beaver company name and will operate as a branch plant for the production of partition tile, gypsum lath and kindred products. Plans are under advisement for expansion.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a steam shovel, Marion type preferred.

The Pullman Car & Mfg. Co., Pullman Building, Chicago, has filed plans for the construction of four car shops at its Kirkwood plant, Atlanta, Ga., to cost about \$150,000 with equipment.

## Indiana

INDIANAPOLIS, Feb. 21.

PLANS are being completed for a new vocational building at the central high school, Evansville, Ind., to cost in excess of \$100,000, for which bids will be asked soon by the Board of Education. Frank J. Schlotter, 113 South Fourth Street, is architect.

The Thiesing Veneer Co., Indianapolis, has filed plans for a one-story addition, 67 x 108 ft.

S. Cohen & Son, 140 West Vermont Street, Indianapolis, have awarded a general contract to the Universal Construction Co., 1925 Massachusetts Avenue, for a two-story and basement automobile service building and machine shop, 100 x 140 ft., to cost more than \$60,000 with equipment. Bennett Kay, Lemcke Building, is architect.

The Sherman White Co., Clinton and Murray Streets, Fort Wayne, Ind., has tentative plans for a new cold storage and refrigerating plant, to cost about \$45,000. M. S. Mahurin, 124 West Wayne Street, is architect. H. W. Davidson is secretary and general manager.

The recently reported factory branch enlargement at San Antonio, Tex., of the S. F. Bowser Co., Inc., Fort Wayne, Ind., manufacturer of gasoline pumping equipment, etc., will not be carried out, it is stated, at present.

## Gulf States

BIRMINGHAM, Feb. 21.

PLANS are being completed by the Lockney Cotton Oil Co., Lockney, Tex., recently formed with a capital of \$250,000, for a new plant, to cost close to \$100,000 with equipment. The installations will include a battery of hydraulic presses, linter and seed handling machinery, conveying apparatus, etc. R. J. Cummins, Bankers' Mortgage Building, Houston, Tex., is consulting engineer, and will be in charge of construction.

Fire, Feb. 12, destroyed a portion of the works of the Coe Belting & Supply Co., 205 South Peters Street, New Orleans, mechanical and mill equipment, with loss in excess of \$50,000.

The Houston Lighting & Power Co., Houston, Tex., has arranged an expansion and improvement program during 1927, to cost about \$4,700,000. Three new automatic power substations will be constructed in the North Side, \$325,000; Magnolia Park, \$300,000, and West End district, \$135,000.

The Winter Garden Securities Co., Republic Bank Building, Dallas, Tex., W. B. Bass, secretary-treasurer, plans the construction of a one-story ice-manufacturing plant, to cost about \$60,000 with equipment, in connection with a fruit-canning and dehydrating plant in the Carrizo Springs section.

The Hughes Tool Co., 300 Hughes Street, Houston, Tex., has awarded a general contract to the Houston Structural Steel Co., Washington Street, for a one-story addition, to cost about \$19,000.

The Standard Mfg. & Engineering Corporation, Duval Building, Jacksonville, Fla., has been inquiring for a 60-in. bed lathe.

The Mason-Brown Ice Co., Huntsville, Ala., is planning the construction of a new one-story plant, to cost about \$35,000 with machinery.

The Micolithic Products Co., Houston, Tex., Clarence Kendall, vice-president, is considering plans for a new grinding mill at its properties in Hudspeth County, for aggregates for cement and stucco work, to cost about \$75,000. Conveying, elevating and other equipment will be installed.

The Dade County Board of Public Instruction, Miami,

Fla., plans the installation of manual training equipment in its proposed four-story and basement senior high school, estimated to cost \$1,000,000, for which superstructure will soon be placed under way.

The Louisiana Portland Cement Co., New Orleans, has acquired a tract of cement rock deposits north of Mobile, Ala., and will develop as a source of raw material for its mill. Crushing, extraction and power equipment will be installed. The entire project will cost in excess of \$300,000.

W. M. Smith & Co., Birmingham, machinery dealers, have inquiries out for a 100 lb. steam hammer.

The Central Power & Light Co., Frost Building, San Antonio, Tex., is arranging for the construction of a new ice-manufacturing plant at Luling, Tex., to cost close to \$50,000 with equipment.

The Board of Education, Natchez, Miss., plans the installation of manual training equipment in a proposed three-story high school, to cost \$250,000, for which bids will be asked on a general contract early in March. P. J. Krouse, M. & W. Building, Meridian, Miss., is architect.

The Santa Rosa Cement Co., which was organized by C. L. Hall to build a plant on the Tombigbee River, near St. Stephens, Ala., has transferred the entire property to the International Cement Corporation, which will hold it for later development, and the plant, which was designed by H. K. Ferguson Co., Cleveland, will not be built as contemplated.

## Detroit

DETROIT, Feb. 21.

THE Ward Electric Refrigerator Co., 1221 Beaufait Street, Detroit, has closed its local plant for immediate removal to Buchanan, Mich., where operations will be considerably increased. It is proposed to provide facilities for the employment of 200 persons at the new location.

The Panyard Machine & Mfg. Co., 743 Beaubien Street, Detroit, has revised plans under way for its one and two-story plant at Muskegon, Mich., to cost \$30,000. Vanderwest & Child, Montgomery Building, Muskegon, are architects.

A power plant will be constructed by the Detroit Creamery Co., Cass and Adams Streets, Detroit, at its proposed two-story condensery at Midland, Mich., for which plans have been completed by Albert Kahn, Inc., Marquette Building, Detroit. The entire project will cost about \$200,000.

The Luce Furniture Co., Grand Rapids, Mich., has awarded a general contract to the Palmer Construction Co., Grand Rapids Savings Bank Building, for a six-story plant, 125 x 300 ft., to cost about \$500,000 with machinery. Hampton Hoult is secretary and treasurer.

The Universal Cooler Corporation, Book Building, Detroit, with plant at 1214 Eighteenth Street, manufacturer of electric refrigerating equipment, has acquired a 5 acre tract in the Lincoln Park district, as a site for a new plant. Plans for the initial unit will soon be drawn. It is reported to cost more than \$75,000. The company has increased its capitalization to carry out the expansion.

The J. C. Miller Co., Grand Rapids, Mich., has been appointed agent for copper and brass sheets, tubes, stampings and rods made by the Dallas Brass & Copper Co., 820 Orleans Street, Chicago.

## St. Louis

ST. LOUIS, Feb. 21.

BIDS will be asked soon by the Board of Public Service, City Hall, St. Louis, for a repair shop, automobile service and garage building, and central heating plant for the fire department, to cost more than \$400,000 with equipment.

The Alpha Portland Cement Co., 140 South Dearborn Street, Chicago, has awarded a general contract to the Gates Construction Co., Chemical Building, St. Louis, for a three-story addition to its mill at Continental, Mo., to cost close to \$100,000.

The Krey Packing Co., 2100 Bremen Avenue, St. Louis, is said to be planning the installation of a cold storage and refrigerating plant in its proposed plant at 6600 North Broadway. The entire project will cost more than \$750,000 with equipment. Frederick C. Krey is president.

The Independent Oil & Gas Co., Okmulgee, Okla., is arranging for a bond issue of \$6,500,000, a portion of the proceeds to be used for extensions and betterments in its local oil refinery, including the installation of additional machinery.

The Lime Products Co., Home Insurance Building, Little Rock, Ark., is reported to have engaged the Lund Engineering Co., same address, to prepare plans for a new mill for the manufacture of Portland cement, near White Cliffs, Ark., to cost more than \$400,000. A. B. Banks is president.

Travel Air, Inc., Wichita, Kan., care of Glen H. Thomas, Wheeler-Kelley-Hagny Building, Wichita, architect, has asked bids on general contract for a one-story plant 75 x 275 ft., for the manufacture of airplanes and parts, to cost about \$55,000 with equipment.

The St. Louis-San Francisco Railway, Frisco Building, St. Louis, is said to have authorized plans for rebuilding the portion of its shops at Springfield, Mo., recently destroyed by fire, estimated to cost \$250,000 with equipment. R. C. Stevens, address noted, is company architect.

The Board of Education, Ponca City, Mo., plans the installation of manual training equipment in its proposed three-story high school to cost \$300,000. Smith & Senter, Masonic Temple Building, are architects.

Elmer Boillot, Scarritt Building, Kansas City, Mo., architect, has completed plans for a one-story automobile service, repair and garage building, 200 x 212 ft., to cost about \$90,000 with equipment.

The City Ice Co., Twenty-first and Campbell Streets, Kansas City, Mo., has begun the construction of a one-story ice-manufacturing plant to cost about \$80,000. The Henric-Lowry Engineering Co., Security Building, is consulting engineer.

Whealton & Townsend, Inc., 120 East Brady Street, Tulsa, Okla., has been appointed distributor in eastern Texas for the Chicago Pneumatic Tool Co., New York. The Tulsa company maintains sales and service offices in Dallas and Houston, Tex., and the offices formerly maintained in those cities by the pneumatic tool company will be discontinued.

## Pacific Coast

SAN FRANCISCO, Feb. 16.

CONTRACT has been let by the Ferro Enameling Co., 880 Sixtieth Street, Oakland, Cal., to the Herrick Iron Works, local, for a new one-story plant to cost about \$30,000.

The Los Angeles School District, Chamber of Commerce Building, Los Angeles, will soon begin the erection of a new vocational shop on the Richard Henry Dana junior high school site, 1501 Cabrillo Avenue, San Pedro, in connection with a new three-story school, the entire project to cost \$350,000.

The Board of Kern County Supervisors, Bakersfield, Cal., will take new bids for a proposed one-story machine shop and repair plant, to cost \$30,000 with equipment. Bids recently received have been rejected. C. H. Biggar, Bank of Italy Building, is architect.

The Associated Oil Co., 79 New Montgomery Street, San Francisco, has plans under way for a one-story automobile service, repair and garage building at Emeryville, Cal., for company motor trucks and cars, estimated to cost \$100,000 with equipment. The company engineering department is in charge.

The Board of Education, Independent School District No. 1, Lewiston, Idaho, contemplates the installation of a manual training equipment in its proposed new three-story high school, to cost \$250,000. C. Richardson, Lewis Building, Portland, is architect.

Kenneth Macdonald, Jr., Spring Arcade Building, Los Angeles, architect, has filed plans for a thirteen-story and basement automobile service, repair and garage building, 80 x 115 ft., to cost \$450,000 with equipment.

Henry L. Gray, Henry Building, Seattle, is at the head of a project to construct and operate a new pulp and paper mill on the Tideflats, near the present plant of the Shaffer Box Co. A company will be organized to carry out the project. The initial units are reported to cost in excess of \$350,000 with equipment.

The Julian Oil Co., Huntington Beach, Cal., has plans for a new gasoline refinery to cost about \$50,000 with equipment.

## Foreign

THE Ford Motor Co., Detroit, is reported to have plans under advisement for the construction of an assembling plant at Balboa, Panama Canal Zone, to cost in excess of \$200,000 with equipment. Investigations are under way for a site.

Plans are being completed for the construction of a new steam-operated electric generating plant near Taihoku, Japan, with initial output of about 5000 kw. The project

is expected to require about 12 months for completion. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Japan No. 234615; also at the office of the American Consulate, Taihoku, Taiwan, Japan, Charles L. DeVault, consul general.

Col. Hugh L. Cooper, 101 Park Avenue, New York, consulting engineer, in charge of the proposed hydroelectric power project of the Russian Soviet Government on the Dneiper River, will place contracts, it is stated, at an early date for the initial equipment and machinery required for the work. The project will cost in excess of \$50,000,000. It is likely that orders will be placed through the Amtorg Trading Corporation, 165 Broadway, New York, official purchasing agent for the Soviet Government.

The Upper Rhine Railway Co., Mannheim, Germany, has plans for the construction and electrification of its lines at Mannheim and other points in the State of Baden. The project will cost about \$3,570,000, including equipment, power plant, etc. The American Consulate, Stuttgart, Germany, Eric W. Magnuson, consul, has information regarding the project.

## Cleveland

CLEVELAND, Feb. 21.

MACHINE tool sales continue light. Some dealers report a better volume of inquiry for prices on machines of various types than a few weeks ago, but many prospective purchasers state that they will not buy additional equipment until business picks up. This attitude of hesitation seems quite general. Industrial plants engaged in making automobile parts and other products are busier than last month, but few are in full operation. A local steel plant during the week purchased a 48-in. 200-ton wheel press, and a local stamping company bought a 14-in. Pratt & Whitney vertical surface grinder.

The Board of Education, Bellevue, Ohio, contemplates the installation of manual training equipment in a proposed two-story and basement high school, estimated to cost \$250,000, for which plans are being drawn by Millot & Parker, Bliss Building, Sandusky, Ohio, architects.

The Patterson Foundry & Machine Co., Walnut Street, East Liverpool, Ohio, will soon have plans ready for the first two buildings of its new plant in the East End section, consisting of a one-story machine shop, aggregating 100,000 sq. ft. of floor space, and two-story laboratory, experimental and pattern-making shop, totaling close to 50,000 sq. ft. of floor area. Contracts for equipment will be placed within the next 30 days. Following the completion of the machine shop, the company will proceed with work on a new foundry unit, and later another unit will be constructed for the manufacture of general steel products. The initial investment will total more than \$500,000, instead of a smaller sum, previously noted. C. F. Clark is construction engineer, in charge of erection; A. B. Kempier is chief engineer.

The G. E. Olenberg Motor Sales Co., 3201 West Twenty-fifth Street, Cleveland, is reported to be considering a new two-story service, repair and garage building to cost \$100,000. L. F. Skeel, 3719 Cypress Avenue, is architect.

The Board of Control, Dover, Ohio, is asking bids until March 15 for an addition to the municipal electric lighting plant to cost \$100,000.

## Pittsburgh

PITTSBURGH, Feb. 21.

WHILE sales for single machines are fairly frequent, important inquiries made during the latter part of last year still are dormant, and there have been few additions to the prospective list in the past few weeks. The Pittsburgh & Lake Erie Railroad recently bought a carwheel borer, but demand from the railroads is disappointing. Business is on a requirement basis, and early delivery is one of the conditions of most sales.

The Warren Electric Heating Appliance Co., Warren, Pa., has been organized by Emil Stransky, Warren, and associates, to operate a local plant on Lexington Avenue for the manufacture of electric heating equipment.

The Warren Axe & Tool Co., Warren, Pa., is reported to be planning the erection of two one-story additions. It is understood that the expansion will provide for the proposed increased production brought about through discon-

tinuance of a branch factory at Dunkirk, N. Y., recently destroyed by fire.

The Standard Steel Spring Co., Coraopolis, Pa., is completing plans for a one-story addition, 75 x 250 ft., and 120 x 400 ft., to cost close to \$100,000 with equipment.

The West Penn-Monongahela Electric Co., Fairmont, W. Va., is said to have plans for the immediate construction of a new electric power house near Hundred, W. Va., to cost in excess of \$70,000 with equipment.

The Guyan Machine Shops, Logan, W. Va., has been making inquiries for a single pulley drive lathe, 36 x 14 in.; a milling saw for handling round stock up to 9 in.; a punch and slitting shear for plate up to  $\frac{1}{4}$  in. thick; a 2 to 3 ton electric hoist, and forge blowers.

The St. Marys Sewer Pipe Co., St. Marys, Pa., manufacturer of vitrified pipe, has awarded a general contract to the Hughes-Foulkrod Co., Pittsburgh, for an addition, 300 x 300 ft., to cost close to \$250,000 with machinery. It will replace a recent fire loss. C. A. Searing, Farmers' Bank Building, Pittsburgh, is architect and engineer.

The Potomac Light & Power Co., Martinsburg, W. Va., has secured permission to dispose of a common stock issue of 5000 shares, no par value, a portion of the fund to be used for extensions and improvements.

## Milwaukee

MILWAUKEE, Feb. 21.

DEARTH of new industrial construction in this locality limits new business in machine tools. Inquiry is fair but seldom goes beyond one or two items. Automotive industries are buying sparingly, although prospects are improving. General industrial demand, while not large, is the principal source of new business. Used tools are moving rather slowly. The supply is moderate and is not increasing rapidly, so that the situation is not altogether unfavorable.

The Standard Oil Co. of Indiana will build a \$100,000 garage and machine shop as an extension of its district plant at 2-10 Copeland Avenue, LaCrosse, Wis. Plans are being completed by R. N. Allen, engineer, 910 South Michigan Avenue, Chicago. Bids will be taken about March 10 or 15. H. E. Bruce is district manager at LaCrosse.

The Board of Education and Board of Industrial Education, Manitowoc, Wis., have voted to proceed with the construction of a general shop building costing about \$60,000 as part of the Vocational School at Fourteenth and Clark Streets, but will abandon the plan of erecting a new junior high school. Bids will probably be asked early in April. Robert Toche is secretary of the industrial board.

The Parker Pen Co., Janesville, Wis., manufacturer of fountain pens, metal pencils, etc., has postponed the construction of a proposed six-story manufacturing and warehouse addition, 45 x 142 ft., until fall. Plans are by F. A. Carpenter, architect, Brown Building, Rockford, Ill. George S. Parker is president.

The Western Printing & Lithographing Co., Racine, Wis., has let the general contract for the erection of its new plant to the Austin Co. The total investment will exceed \$250,000. E. H. Wadewitz is secretary and treasurer.

Plautz & Fry, Inc., 1016 Becher Street, Milwaukee, manufacturing sheet metal products, is in the market for some equipment, including crimping machines.

The Moloch Co., Kaukauna, Wis., manufacturer of automatic stoking equipment and doing a general foundry and machine shop business, has changed its name to the Moloch Foundry & Machine Co. The plant was originally established as the Kaukauna Foundry & Machine Co. The capital stock has been reduced to \$200,000, but there is added \$175,000 of preferred stock.

The Ajax Tool & Die Co., 166 Reed Street, Milwaukee, has incorporated under the same style with a capital stock of \$15,000. Paul H. Feiertag has acquired an interest and will be active in the management with Fred A. Scherman, one of the original owners.

The Special Machinery & Mfg. Co., 1919 St. Paul Avenue, Milwaukee, has awarded contracts for the erection of a one-story shop addition, 30 x 120 ft., costing about \$20,000 complete.

The Kattnig Machine Co., 615 Clybourn Street, Milwaukee, has incorporated as the Kattnig Machine & Supply Co., with a capital stock of \$25,000. It manufactures pipe, valves, fittings, etc. Thomas Kattnig remains the principal owner and in active charge.

The Dells Paper & Pulp Co., Eau Claire, Wis., has engaged Douglas & Kryster, consulting engineers, 425 East Water

Street, Milwaukee, to prepare plans and estimates of improvements in its steam generating plant. The probable cost will be upward of \$100,000. Bids will be taken some time in April.

## Cincinnati

CINCINNATI, Feb. 21.

INCREASED interest shown by automobile makers and railroads has enlivened the market somewhat the past week. One manufacturer in the Detroit district has purchased 12 lathes, while another has contracted for nine machines. Inquiries indicate that substantial buying of equipment by the automotive industry will materialize in the next month. The New York Central has taken two engine lathes in addition to the four bought recently. The Missouri Pacific is reported to be in the market for four lathes. An Eastern electrical manufacturer has purchased two radial drills, as well as other equipment.

Business booked from companies in the general industrial field has been of sizable proportions.

The following list has been issued by the Baltimore & Ohio Railroad, for which bids are due Feb. 28 in the office of the purchasing agent, W. S. Galloway, Baltimore. All tools are to be motor driven, motors being 440-volt, 3-phase, 60-cycle.

Three 18-in. x 6-ft. engine lathes.  
One 24-in. engine lathe.  
One 48-in. x 20-ft. geared-head engine lathe.  
Three 16-in. x 10-ft. geared-head engine lathes.  
Five 20-in. x 12-ft. geared-head engine lathes.  
One 24-in. x 16-ft. engine lathe.  
One 32-in. x 16-ft. engine lathe.  
One 32-in. shaper.  
One 24-in. heavy-duty shaper.  
One 24-in. x 24-in. x 4-ft. crank planer.  
One 30-in. x 30-in. x 30-ft. crank planer.  
One heavy-duty guide grinder.  
One internal grinder.  
One cylinder head joint facing machine.  
One magnetic surface grinder.  
One self-contained bench drill press.  
One 2  $\frac{1}{2}$ -in. forging machine.  
One 20-in. sensitive drill press.  
One 60-in. radial drill.  
One 12-in. x 36-in. magnetic surface grinder.  
One 12-in. x 36-in. cylindrical grinder.  
One power hack saw.  
One radius grinder.  
One 1 to 6-in. pipe threading machine.  
One  $\frac{1}{2}$  to 2-in. pipe threading machine.  
One portable cylinder head joint facing machine.  
One 2 to 6-in. electric butt welder.  
One 7-ft. double-head rail drill, swivel head, with fixed distance of 14 ft.  
One pneumatic flanging machine.  
One  $\frac{1}{2}$  to 3-in. pipe threading machine.  
One cut-off saw and tube expanding machine.  
One stock adjusting machine.  
One knee-type milling machine, similar to No. 5 Cincinnati.  
One 12-in. x 36-in. universal cylindrical grinder.  
One 90-in. double-head combination quartering and crank pin truing machine.

The McPherson-Huff Tool Co., Sabina, Ohio, has been organized to manufacture automobile tools, such as screw drivers, etc. It expects to begin production about March 1.

The Drummond Mfg. Co., Louisville, Ky., manufacturer of gray iron and semi-steel castings, has taken over the entire property and business of C. J. Walton & Sons, local manufacturer of steam power boilers, smoke stacks and heavy sheet iron, and will operate in the future as a department of the Drummond company.

The Arcraft Metal Products Co., Columbus, Ohio, stove manufacturer, is moving its plant to Martins Ferry, W. Va., where it will occupy the factory formerly operated by the Davies Glass Co.

The Clifton-Pratt Machinery Co., 1224 West Eighth Street, Cincinnati, has changed its name to the Clifton Machinery Co.

Permit has been secured by the Standard Pulley Co., Powers Street and the Baltimore & Ohio Railroad, Cincinnati, for a one-story addition, for which general contract has been let to the Weber-Bell Co., Cincinnati.

The Ball Knob Mining Co., Madisonville, Ky., is planning for the installation of grinding mills for handling ochre and other equipment for commercial production. R. M. Brooks is president.

The Board of Education, Memphis, Tenn., contemplates the installation of manual training equipment in a proposed

three-story and basement high school at Bellevue Boulevard and Carr Avenue, to cost \$250,000, for which plans will be completed soon by Jones & Furbringer, Porter Building, architect.

Alexander M. Robinson, Georgetown, Ky., machinery dealer, is in the market for a one-story standard steel building, comparatively small size.

C. F. Brower & Co., Main and Spring Streets, Lexington, Ky., plan to rebuild the portion of their machine and repair shop recently destroyed by fire, with loss reported at more than \$20,000 with equipment.

The J. T. Mfg. Co., Nashville, Tenn., recently organized with a capital of \$50,000 by A. C. Jones and associates, has acquired the foundry and machine shops at the Centennial Boulevard and Fifty-seventh Avenue, North, and will occupy for a new plant for the manufacture of refrigerators. It is proposed to have enameling work carried out at the local plant of the Tennessee Enamel Products Co., Charl Park, for the present.

The City Council, Newport, Ky., is said to be completing plans for a new hydroelectric generating plant on the Pigeon River, to cost close to \$175,000 with equipment.

## Canada

TORONTO, Feb. 21.

MACHINE tool sales the past week compare favorably with those of the previous week. Recent inquiries include tools for railroad shops, automotive plants and several industrial works now under construction, but it is not expected that orders will develop within a month or six weeks. Increased sales of small tools are reported.

The plant of the Dominion Wheel & Foundry Co., Port Hope, Ont., was damaged by fire Feb. 13. It will be repaired immediately and it will not be necessary to close down.

The Brant Sand & Gravel Co., Ltd., has purchased the plant and property of the Brantford Sand & Gravel Co., Brantford, Ont. It is the intention of the company to overhaul the present equipment and add some new machines. A three-deck Niagara shaker screen will be installed, together with complete new washing machinery. The plant will be equipped electrically throughout. Herbert McIntyre will be in charge of operations.

The Algoma District Power Co., Sault Ste. Marie, Ont., will start work immediately on the power development plant at Michipicoten Falls. The present work will consist of a 2,000-hp. addition, for which plans have been approved.

The Frontenac Brick Co., Ltd., East Beauport, Que., has been incorporated with a capital stock of \$1,000,000, with P. A. Galarneau, president. It proposes to start work soon on the erection of a factory, to have a daily capacity of 50,000 brick.

The Light & Heat Commission, Guelph, Ont., plans the erection of two sub-stations this year, to cost \$50,000. J. J. Keeg is secretary.

The Northern Grain Co., Winnipeg, Man., has purchased a site at Port Arthur, Ont., where a 2,000,000 bu. elevator will be erected.

The Guelph Stove Co., Guelph, Ont., will build a \$40,000 addition to its plant, construction work to start soon.

The Town Council, Harriston, Ont., contemplate installing an emergency power plant at its waterworks.

The Scarboro Utilities Commission, Scarboro, Ont., is having plans prepared for the erection of new power plant.

## Western Canada

The Dominion Bridge Co., Montreal, has decided to establish a plant in the West to take care of its Pacific Coast business. It will be erected in Vancouver, B. C., and operated as a branch of the parent company. It is understood that the cost will be about \$300,000.

The Richardson Road Machinery Co., Saskatoon, Sask., will build a factory at a cost of \$30,000.

A wall chart giving decimal equivalents of standard wire gage designations has been issued by Sleeper & Hartley, Inc., Worcester. The figures are large and are in black on cream. The size of the chart is 23 x 28½ in.

Net earnings during 1926 of the Sheffield Steel Corporation, Kansas City, Mo., after depreciation, interest and taxes, were \$618,202, equivalent to \$7.07 a share on the no par common stock. The corporation's balance sheet showed total assets of \$5,766,058 and net current assets of \$1,323,975.

## Calendars Received

**Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.**—Size 9 x 14 in. with highly artistic poster 6½ x 8½ in., picturing in black and gold, the Montour Glen, near Montour Falls. Calendar, 2½ x 5½ in. red and black on white.

**V. Damodera Shenoy & Co., Alleppy, India.**—Poster size 15 x 20 in., with attractive map of India, 13 x 14 in., in colors and embossed. The calendar section is 3 x 6 in.

**Warren Webster & Co., Camden, N. J.**—Size 11 x 17 in., with large calendar for current month and two small calendars for previous and succeeding month. Poster section, 7 x 10 in., contains photographic reproductions of buildings in which the Webster systems of steam heating are installed.

**International Molding Machine Co., 2008 West Sixteenth Street, Chicago.**—Size 9 x 12 in., stiff cardboard. Poster section at top of sheet pictures installations of the company's machines. Calendar is 3½ x 6½ in., black on white. Card for each month is issued separately.

**1927 Railroad Calendar.**—Committee on Public Relations of Eastern Railroads, New York. For a second year the railroad interests have issued a calendar indicating the distribution of the major items of their expenses. Out of the gross revenue of an entire year it took the receipts of the specified number of days to pay for the various services or materials mentioned. Compared with the 1926 calendar, the wages' item has been reduced from 157 to 153 days; locomotive fuel from 27 to 24 days, and materials and supplies from 70 to 69 days. Other operating expenses have gone up from 24 to 25 days; dividends from 19 to 20 days; surplus for improvements or resources from 6 to 12 days. Taxes at 21 days and interest and rents at 41 days remain as in 1926.

**Koppers Co., Pittsburgh.**—Poster size 13½ x 28½ in.; calendar, 7½ x 12 in., black on white, figures 1 in. high. Two smaller boxes contain calendars for one month before and after current month. Large photographic reproductions of by-product coke plants are at the top of each poster sheet.

**National Tube Co., Pittsburgh.**—Poster size 16 x 30 in.; calendar 10½ x 13, brown on buff, figures ½ in. high, three months on one sheet. Artistic pipe mill scene in color, with gold border, at top of poster sheet.

**General Electric Co., Schenectady.**—Poster size 16 x 30 in. Three months on one sheet, current month being 7½ x 15 in., red and black on buff, figures 1 in. high and two other months 3½ x 6½ in. Unusually artistic reproductions of paintings, 11½ x 14½ in., depicting electric flood lighting of buildings, coal mining with electricity, the electric fleet, electricity in steel mills, electric arc welding, etc., are at top of each sheet.

**Phillips Isham, 30 Church Street, New York.**—Size 10 x 10½ in., calendar 5½ x 8½ in., black and red on white.

**New Departure Mfg. Co., Bristol, Conn.**—Size 16 x 35½ in., three calendars, each of which is 8 x 15 in., mounted on stiff cardboard. The current month is in red and black, and the other two months are in red and gray on black, with smaller figures. An attractive aerial colored view of the plant is at the top of the calendar sections.

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## NEW TRADE PUBLICATIONS

**Mine and Industrial Track Equipment.**—Bethlehem Steel Co., Bethlehem, Pa. An illustrated catalog of 160 pages and cover giving complete information, photographs and diagrams of track and accessories. One table in the book gives the number of splice bars, bolts and spikes required for one mile of track, and another table gives the same information for 1000 tons of rails. Lengths and weights of rails and fastenings, weights and dimensions of standard track bolts, a table of spike dimensions and much other information of similar character are given in the catalog.

**Mechanical Stokers.**—Joseph Harrington Co., Harvey, Ill. Catalog 100 describing the King Coal automatic mechanical stoker designed primarily for boiler room use in eliminating the smoke nuisance.

**Turbines.**—General Electric Co., Schenectady, N. Y. Bulletin GEA-578 devoted to the company's Type D mechanical drive turbines. Various diagrams and details of construction are included.

**Fans and Blowers.**—American Blower Co., Detroit. Bulletin 8001, describing the company's fans and blowers for producing circulation of air and gases. The greater part of the bulletin is given over to a series of capacity tables applying to the various sizes and types of equipment.

**Graphic Instruments.**—Esterline-Angus Co., Indianapolis. New catalog of 72 pages recently issued by the company, including wealth of information on graphic instruments. Bulletin 1126 is devoted to the heavy duty D'Arsonval meter element.

**Industrial Diamond Uses.**—Wheel Trueing Tool Co., Detroit. "The Diamond and Industry," a booklet sketching the growing use of industrial diamonds. An introduction deals with diamond deposits and mines in South Africa, and the pages following devote particular attention to the use of diamonds as a means of trueing the abrasive wheel for accurate grinding.

**Shock Absorbing Fixture Hangers.**—V. V. Fittings Co., 705 Cherry Street, Philadelphia. Leaflet describing hangers for electric lights and other similar fixtures, with a universal joint which permits a swinging radius of 23 deg. The hanger is designed for places subject to shocks or excessive vibration. It comes in several types.

**Special Steels.**—Erie Steel Corporation, Tribune Building, New York. Four-page leaflet, illustrated, describes Styrian steels and their special application.

**Case-Hardening.**—Jones & Laughlin Steel Corporation, Pittsburgh. An eight-page leaflet, illustrated, discusses the advantages and uses of "Jalcase," the "Gold Medal Steel," particularly suited for case-hardening.

**Engineered Products.**—Gradow Mfg. Co., Land Title Building, Philadelphia. Three loose-leaf bulletins, Nos. 11, 21 and 31, of 8 pages each, describe respectively wrought construction expansion joints of the sliding sleeve type, steam separators of the plain and receiver types, and storage water heaters with U-tubes. Illustrations, dimensions and price lists feature each bulletin. Templates for drilling flanges, linear expansion of pipe lines, and tank dimensions are among the tables covered in the bulletins.

**Arc Welding Accessories.**—General Electric Co., Schenectady, N. Y. GEA-571 describing miscellaneous arc welding accessories; included are hand shields and helmets for operators, electrode holders, stabilizing reactors, scratch brushes, welding electrodes and welding cables.

**Elevator Specifications.**—Warner Elevator Mfg. Co., Cincinnati. Booklet attempting to provide list of specifications needed for defining elevator requirements. All various factors such as load, distance, control and cables are included with method of specification on different types of units.

**Hoists and Elevators.**—Robert Gillispie Co., 147 First Street, Cambridge, Mass. Leaflets describing the company's ash hoists and lifts, sidewalk elevators and other handling machinery.

A number of questions of importance to the electric arc-welding industry are answered in the first issue of "The Operator's Stabilizer," the new house publication of the Lincoln Electric Co., Cleveland, and edited by A. F. Davis, vice-president of the company. The bulk of the reading matter consists of letters received by the company from the trade with answers and comments by the editor.

## THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)

Hurling bouquets at us is fast becoming a popular international sport. Here is a garland from Turin, Italy:

"THE IRON AGE is the mirror of the amazing industrial achievements of America." — Alberto Bettica, president S. I. M. B. I., manufacturer of pneumatic equipment.

"WHAT is your opinion of American manners, industry, race horses, literature, crime waves, or what have you?" the industrious reporter inquires of the departing celebrity or near-celebrity, after his two weeks' tour, to discover what's what in America.

But William Conor, painter of Irish types, who left our shores last week, departed from the time-honored topics and essayed to libel one of our darlings. "Your labor-saving devices," said William savagely, "tend to standardize to the point of sameness, and to create a dearth not only of original thought but also of local color. . . ."

We should be the last to disparage William's powers of ratiocination, but has he, we ask, given this subject the same careful thought he would give to limning, well, for instance, a No. 1 Grade A Irish type?

Without pausing for reply, we continue our interrogation. "William, is it not true that original thought flowers best when man has some respite from back-breaking drudgery? And do not labor saving devices make that respite possible?"

If William and we were debating this point on the high school rostrum, we imagine that right here William would burst out, "Look at the Greeks! Leaders in the arts!" Pausing for effect, he would then add dramatically, "Did the Greeks have labor-saving machinery in the Golden Age of civilization?"

Then our turn would come. With a superior smile, and with a triumphant ring in our voice, we would say, "Certainly, the Greeks had labor-saving machinery—human machinery—slaves!"

"We never knew who he was, so when he left us we never missed him," said the cast iron pipe man, reminiscently. Sensing a story, we inquired, "Who and why?"

After elevating his Douglasses he began, "Back in the 'nineties most cast iron pipe specifications included the phrase, 'Pipe to be coated by Dr. Angus Smith's method.' Perhaps it meant something at one time, but not in the forty years I have been in the business.

"Well, sir, that phrase was carried through into the present century and was used until an inquisitive engineer conceived the happy thought of asking who Dr. Smith was and what his method might be.

"No one could answer, so the doctor and his method gradually faded out of the cast iron pipe picture."

One of man's achievements in handling what simulates lightning in its power to jump wide air gaps is typified in the way the Commonwealth Edison Co., Chicago, is controlling its underground interconnecting power circuits, which carry current at no less than 132,000 volts. The cables have a hollow core around which are placed the copper conductor wires. Approximately 100 layers of paper are wound around the group of conductor wires and outside of the paper is placed a metal protective sleeve. The entire cable is then inclosed in a lead sheath. The hollow core will be filled with a thin oil, which will be kept under pressure. The oil serves to impregnate the paper and thus add to its insulation properties.

A. H. D.